



Taxonomy of the catfish genus *Pseudoplatystoma* Bleeker (Siluriformes: Pimelodidae) with recognition of eight species

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Abstract

The genus *Pseudoplatystoma* Bleeker consists of three species long recognized as: *P. fasciatum* (Linnaeus), *P. tigrinum* (Valenciennes), and *P. corruscans* (Spix & Agassiz), and five species recently recognized or described here: *P. punctifer* (Castelnau), *P. reticulatum* Eigenmann & Eigenmann, *P. orinocoense* n. sp., *P. metaense* n. sp., and *P. magdaleniatum* n. sp. The eight species form a monophyletic group with two clades that are supported by anatomical features (i.e., skeletal anatomy and myology). One clade (*P. tigrinum* and *P. metaense*) is restricted to the Orinoco and Amazon basins, and the other clade, comprised of the remaining six species, is found in the Guyanas, Orinoco, Amazon, and Paraná basins. The species are diagnosed on the basis of body shape, color pattern (e.g., bars, loops, and spots), skeletal anatomy, and vertebral numbers. *Pseudoplatystoma punctifer* and *P. tigrinum* are sympatric in the Amazon Basin, *P. metaense* and *P. orinocoense* in the Orinoco Basin, and *P. corruscans* and *P. reticulatum*, are sympatric in the Paraná. *Pseudoplatystoma magdaleniatum* (Magdalena basin) and *P. fasciatum* (Guyanas) each occur as the only species of *Pseudoplatystoma* in their respective individual ranges. *Pseudoplatystoma reticulatum* may be sympatric with the two other species in the Amazon Basin, but we have no records of them being captured together in the mainstream or tributaries. All eight species are used as food in both commercial and subsistence fishing, and there is a moderate-sized ornamental fish market for the young and juveniles. A key to adults of the eight species is included.

Key words: *Pseudoplatystoma*, Pimelodidae, South America, tiger catfishes, principal components analysis

Introduction

As recently delimited, the family Pimelodidae (Long-Whiskered Catfishes) is now restricted to about 30 genera and 90 recognized and known but unnamed species (Lundberg and Littmann, 2003), all of which are found in the fresh waters of South America and the lower Isthmian regions. *Pseudoplatystoma*, the subject of this revision, is a monophyletic (Buitrago-Suárez, 2005) assemblage of boldly striped or spotted catfish populations placed in the family Pimelodidae. Standard references and catalogs record only three recognized species in the genus, *P. fasciatum*, *P. corruscans* and *P. tigrinum* (e.g., Burgess, 1989, Lundberg and Littmann, 2003). The diversity of this genus has been underestimated and their systematics are poorly known, in part, because geographic variation in morphology and coloration are displayed and because of a lack of taxonomic studies that firmly diagnose taxa and delimit species boundaries—a situation that has resulted in doubts of the status of such commercially important species as *P. tigrinum*. The absence of a critical review of the taxonomy reflects a lack of consensus on the number of species in the genus. Some authors consider *P. tigrinum* as a synonym or simply as a subspecies of *P. fasciatum* (Burgess, 1989). Two of the nominal species do not have a designated primary type (*P. fasciatum* and *P. corruscans*), and another has no specified type locality (*P. tigrinum*). *Pseudoplatystoma fasciatum* was considered a widespread species in classical works (e.g., Eigenmann

& Eigenmann, 1889, Eigenmann, 1912; Fowler, 1915; Schultz, 1944; Gosline, 1945; Miles, 1947; Ringuelet et al., 1967; Mago-Leccia, 1970; Dahl, 1971, Lauzanne & Loubens, 1985), with a range embracing each major river in the neotropics. However, every major drainage population differs in body shape, pigmentation, and anatomy. For example, the population in the Magdalena River, which is currently considered *P. fasciatum* (Eigenmann, 1922; Dahl, 1971), is distinguished by having unbranched rays in the caudal fin, and a distinctive notch in the suspensorium, and has been isolated from the others species since the uplift of the Cordillera Oriental (13–11.5 mya, Hoorn et al., 1995).

The species of *Pseudoplatystoma* reach large sizes and are familiar due to their distinctively marked color pattern. They often are referred to in the vernacular as "Bagre rayado" or "Pintadillo" (tiger catfish or tiger-shovelnose). Species of the genus also are recognized by having a depressed head, an occipital process extending backward to contact the predorsal plate, and a very long fontanel. They are found in diverse habitats (Reid, 1983) including large rivers, lakes, side channels, flooded forests, and floating meadows (Reid, 1983; Burgess, 1989). The known distribution of *Pseudoplatystoma* includes the major river basins of South America: Paraná, Amazon, Orinoco, São Francisco, Magdalena, Rupununi, Essequibo, and Suriname (Burgess, 1989). None of the nominal species has been reported from the Pacific basin.

Species of *Pseudoplatystoma* are of considerable economic value and a few studies have summarized their general biology (e.g., Loubens & Panfili, 2000). Reports on general biology of *Pseudoplatystoma* cover reproduction and migration (Goulding, 1980; Reid, 1983; Loubens & Aquim, 1986; Kossowski & Madrid, 1986; Reyes & Huq, 1990; Goulding et al., 1996; Loubens & Panfili, 2000), fishery biology (Cordiviola, 1966; Valderrama et al., 1988), habitat and growth (Reid, 1983), basic morphology (Diogo, 2005), and as hosts for trichomycterids (Machado & Sazima, 1983).

This work has several major aims: to recognize and diagnose the species of *Pseudoplatystoma*, to apply correct names to the recognized species, to map their distributions, and to provide color photographs of fresh specimens taken in the field. Our taxonomic conclusions have significant implications for both the ornamental and commercial fishing industries in South America, because catch data have not distinguished the eight species recognized here and the potential impact of fishers on species of *Pseudoplatystoma* remains unknown, but certainly not inconsequential.

Materials and Methods

Available holotypes were examined, measured, x-rayed, and photographed. The type specimens of *P. tigrinum* and *P. punctifer* (large, stuffed, and mounted specimens) were photographed and made available to us. To reduce ambiguity about names, neotypes were designated for those species with no available type specimens, e.g., *P. fasciatum* [the type of the genus] and *P. corruscans*. Species were determined, recognized, diagnosed, and described following the Morphological Species Concept. This concept follows a present research practice regarding the study of species diversity in the neotropics that emphasizes diagnosability or distinctness of populations over traditional geographically widespread, polytypic species (Lundberg et al., 2000).

Morphometric measurements were made using needlepoint dial calipers. Measurements were usually made on the left side of the body, or on the right side depending on state and shape of preservation. Measurements were based on a truss network (Strauss & Bookstein, 1982; Bookstein et al., 1985), and included five truss network cells determined by 12 landmarks (Fig. 1). A total of 32 measurements were taken following the truss network protocol and are presented in Tables 1–8. Principal Components Analysis (PCA) was applied to these measurements using JMP IN (Statistical Discovery Software™). PCA was used to recover statistically different species clusters within the collected morphometric data. To correct for the effect of size, all measurements were log-transformed prior to the application of PCA.

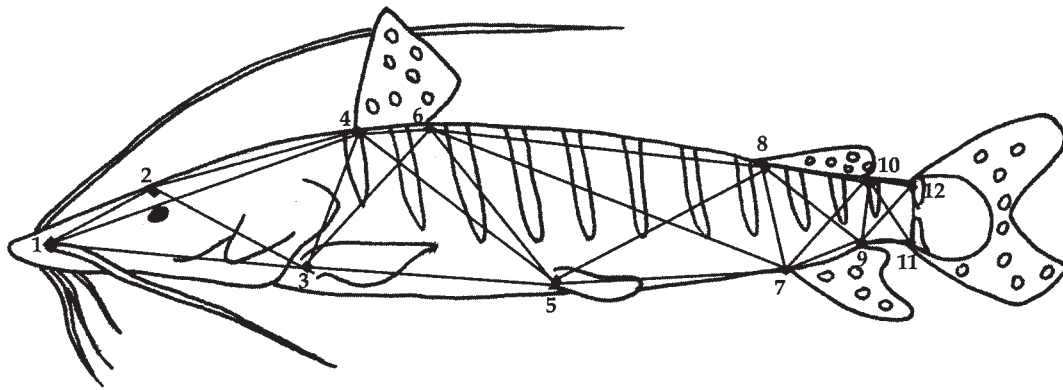


FIGURE 1. Diagrammatic representation of measurements using five truss network cells and landmarks on the side of the body.

Meristic features, e.g., number of vertebrae and gill-rakers, were scored by examining radiographs of three or more specimens of each species or by counting these serially repeated parts on dried skeletons or cleared-and-stained specimens.

Material studied is reported in the "material examined" section for each species and contains the following sequence: institutional acronyms following Leviton et al. (1985), catalog number, number in parentheses refers to number of specimens in the lot, cleared and stained (c&s) or dried skeletons (ds), locality (name of the stream, coordinates, town, country), collector (s), and date.

Results

Pseudoplatystoma Bleeker, 1862

Pseudoplatystoma Bleeker, 1862:10. Type species: *Silurus fasciatus* Linnaeus, 1766. Type by original designation. Gender: neuter. Lundberg and Littmann (2003) stated that *Pseudoplatystoma* is a valid name by first reviser action of Eigenmann and Eigenmann (1888).

Hemiplatystoma Bleeker, 1862:10. Type species: *Platystoma tigrinum* Valenciennes, 1840. Type by original designation. Gender: neuter.

The etymology of *Pseudoplatystoma* is as follows: *pseudes*, (Greek) for false, *platys* (Greek), flat and *stoma* (Greek), mouth. Bleeker used a combination of characters to diagnose his new genus as follows (words in parentheses are ours)

"Snout strongly depressed. Superior maxilla non-prominent. Intermaxillary (premaxillary) teeth minute, vomero-palatine teeth in four patches. Eyes in dorsal position. Nares anterior and tubulated. Long barbels. Spine (pectoral?) serrated, dorsal (spine?) slender. Anal fin short".

Other features noted in the literature (e.g., Ringuet et al., 1967; Dahl, 1971; Mees, 1974) include: flat head with occipital region covered by thin skin; posterior occipital process contacting predorsal plate; fontanel of skull extends from middle of snout to posterior line of eyes, at this point it becomes a groove that reaches the occipital; pectoral fins have one spine and 8 rays; anal fin has one spine and 9 rays; caudal fin is forked with branched rays; branchiostegal rays 14–15. We reevaluated these features.

We found six unique characters to support the monophyly of *Pseudoplatystoma*: foramen formed by the epioccipital process and pterotic (Fig. 2); the articular has a flange or platform on its proximal lateral side (Fig. 3C); the articular presents a large fossa where a novel muscle originates (see Buitrago-Suárez, 2006 and Fig. 3A); the entopterygoid forms a straight angle (Figs. 4A and B); presence of a foramen between the parhypural and hypural at the joint with the compound centrum (Fig. 5); swim bladder expanded anteriorly with one appendicle departing from the anterolateral region on each side (Fig. 6A–C); spotted caudal fin (Figs. 13 and 14).

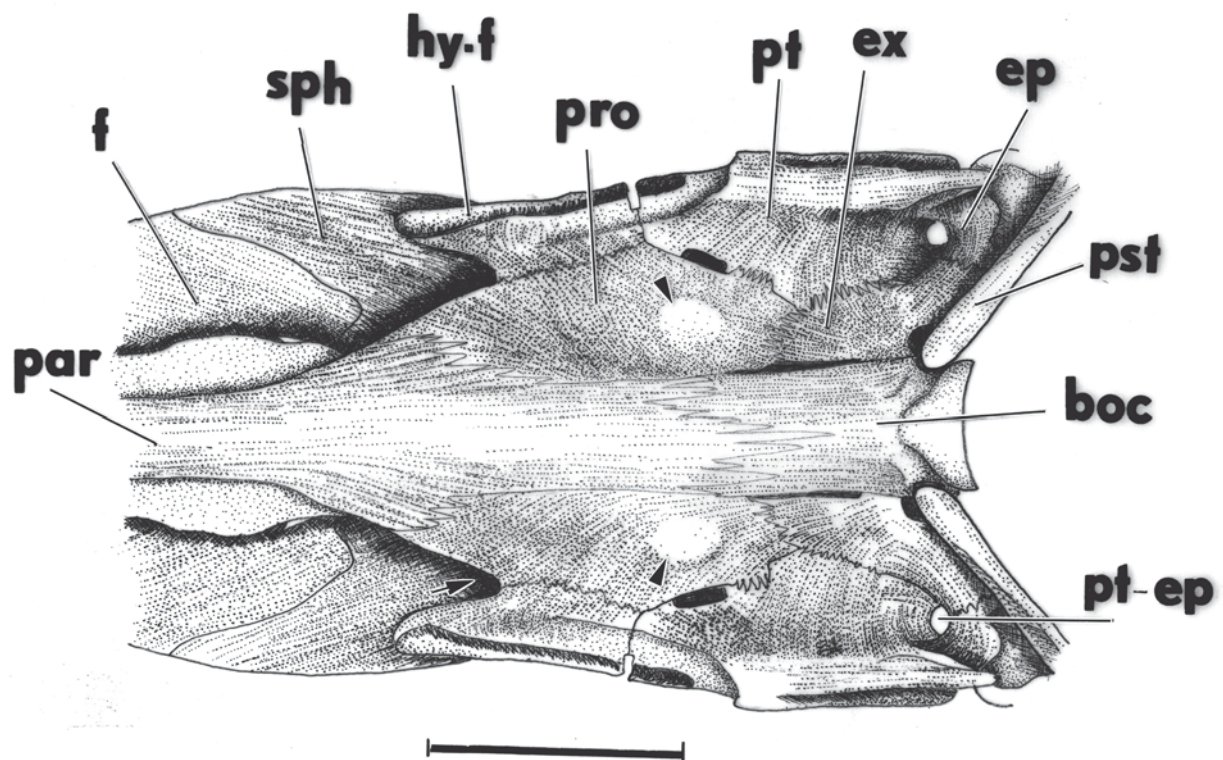


FIGURE 2. Posteroventral view of the skull of *P. fasciatum*, BMNH 1971–29–92–93. Boc, basioccipital; ep, epioccipital; ex, exoccipital; f, frontal; hy-f, hyomandibular fossa; par, parasphenoid; pro, prootic; pt, pterotic; pt-ep, pterotic-epioccipital fossa; sph, sphenotic. Thick arrows point to the superficial extension of the lapillus (inner ear otolith), and small arrow points to the exit of the facial nerve. Scale 1 cm.

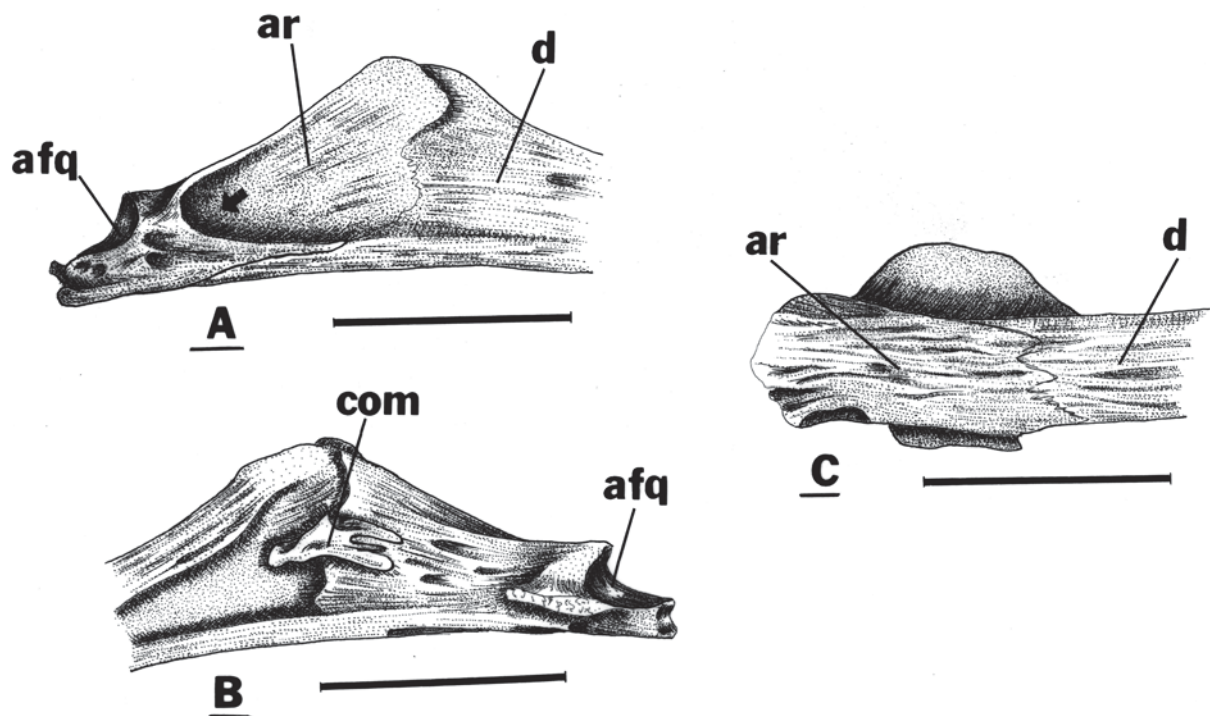


FIGURE 3. A, posterodistal view of the lower jaw, *P. fasciatum*, BMNH 1971–299293. afq, articular facet of the quadrate; ar, articular; com, minute coronomeckelian bone; d, dentary. B, posteroproximal view of the lower jaw. C, posteroventral view (note the flange on the latero-proximal side). Arrow points to a fossa where a novel muscle originates (see Buitrago-Suárez, 2006). Scale 1 cm.

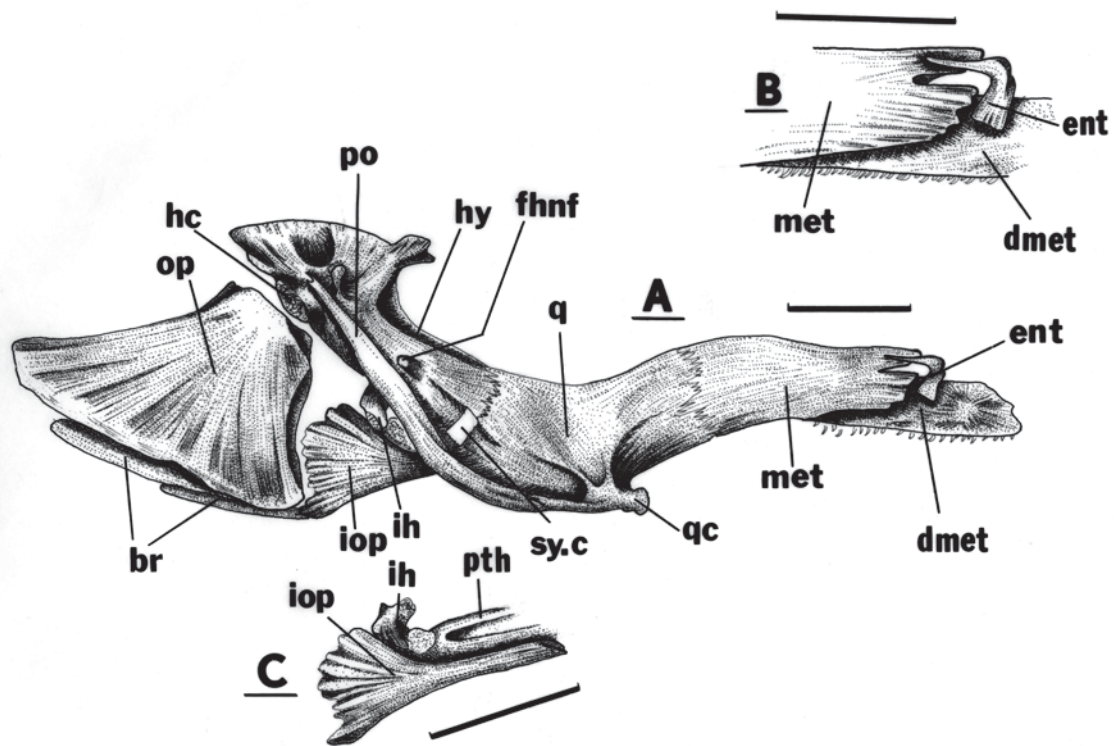


FIGURE 4. A, laterodistal view of the suspensorium, *P. fasciatum*, USNM 225437. br, branchiostegal rays; dmet, dermo-metapterygoid; ent, entopterygoid; fhnf, foramen for the hyomandibular ramus of the facial nerve; hc, hyomandibular condyle; hy, hyomandibula; ih, interhyal; iop, interopercle; op, opercle; po, preopercle; pth, posterohyal; q, quadrate; qc, quadrate condyle; sy.c, symplectic cartilage. B, anterior suspensorium; C, interopercle and associated bones. Scale 1 cm.

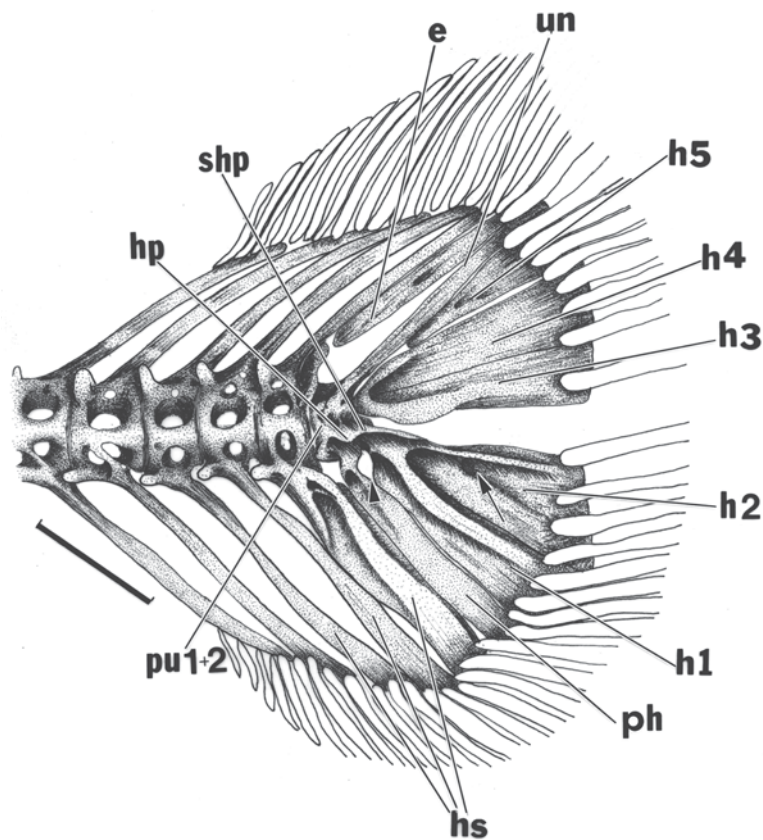


FIGURE 5. Caudal skeleton, *P. fasciatum*, USNM 225437. e, epural; h1-5, hypurals 1-5; hp, hypohyal; hs, haemal spine; ph, parhypural; pu1+u2, (pu1, preural 1) compound centrum; shp, secondary hypurapophysis; un, uroneural. Arrowhead marks a unique foramen between the parhypural and hypural 1 in *Pseudoplatystoma*. Arrow points to a variable depression in the species of *Pseudoplatystoma*. Scale 1 cm.

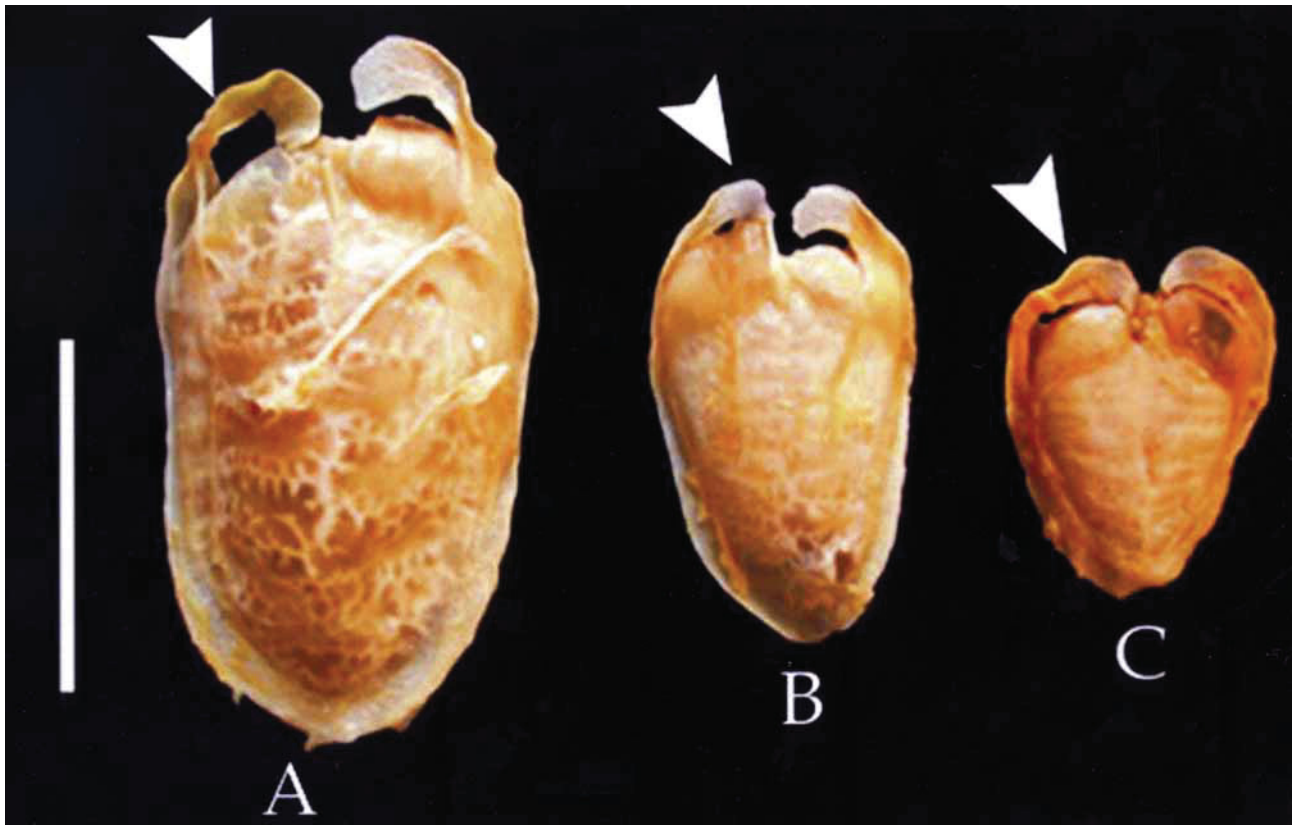


FIGURE 6. Ventral view of the swim bladder, A & B, *P. metaense*, ANSP, 149541; C, *P. orinocoense*, INHS 62069. Arrowheads point to the antero lateral branch or appendicle (see text, diagnosis of *Pseudoplatystoma*). Scale 5 cm.

As recognized here, the genus contains at least 8 species: *P. fasciatum* restricted to the Guyana region; *P. punctifer* (formerly recognized as *P. fasciatum* from the Amazon River); *P. orinocoense*, n. sp., (formerly *P. fasciatum* from the Orinoco basin); *P. magdaleniatum*, n. sp., (formerly *P. fasciatum* from the Magdalena River); *P. reticulatum* (formerly *P. fasciatum* from the Amazon and Paraná rivers); *P. corruscans* (from the Paraná and São Francisco rivers), *P. tigrinum*, restricted to the Amazon basin, and *P. metaense*, n. sp. (formerly *P. tigrinum* from the Orinoco River).

Additionally, we recognize two clades of *Pseudoplatystoma* (see Buitrago-Suárez, 2005), both supported by anatomical characters. In the *P. fasciatum* clade (*P. fasciatum*, *P. punctifer*, *P. orinocoense*, *P. magdaleniatum*, *P. reticulatum*, and *P. corruscans*) the anterior fontanel is almost entirely surrounded by the mesethmoid and frontals. The fontanel is surrounded by the mesethmoid, frontal, and supraoccipital in the *P. tigrinum* clade (*P. metaense* and *P. tigrinum* only) (Figs. 7 and 8). A tooth patch covers the dorsal surface of ceratobranchial 5 and extends beyond 1/3 of the ventral region in the *P. fasciatum* clade. The tooth patch on ceratobranchial 5 covers only the dorsal surface in the *P. tigrinum* clade (Fig. 9). In the *P. tigrinum* clade, the lateral ethmoid bears a small process anteriorly (Fig. 8). The process develops from a ventral elevation that serves as the site for a connection of a bundle of ligaments coming from the entopterygoid. The *P. fasciatum* clade lacks this process.

The presence of a median crest in the posterior process of the supraoccipital is uncommon in pimelodines. This feature does not distinguish unambiguously between the two clades, but is present in *P. tigrinum*, *P. metaense* and *P. magdaleniatum* (Fig. 7).

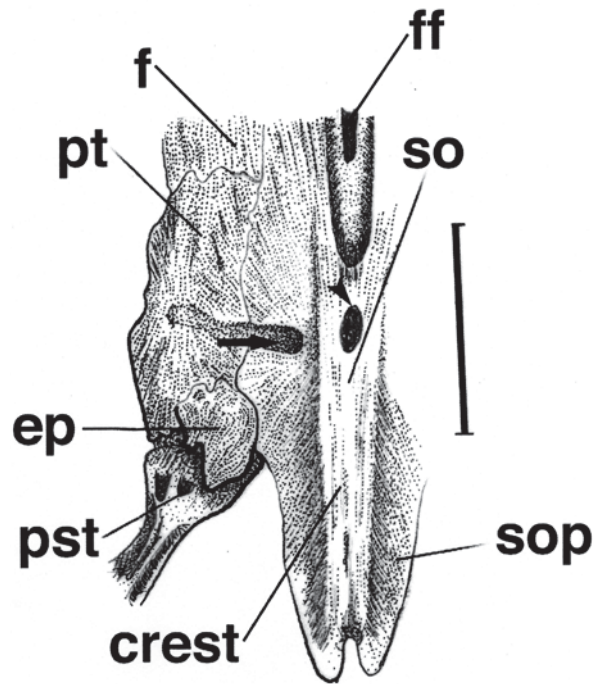


FIGURE 7. Posterodorsal region of the skull, *P. tigrinum*, SIUC 39229. ep, epioccipital; f, frontal; ff, frontal fontanel; so, supraoccipital; sop, supraoccipital process; pst, posttemporal; and pt, pterotic. Arrow points to a groove, arrowhead marks the small posterior fontanel. Scale 1 cm.

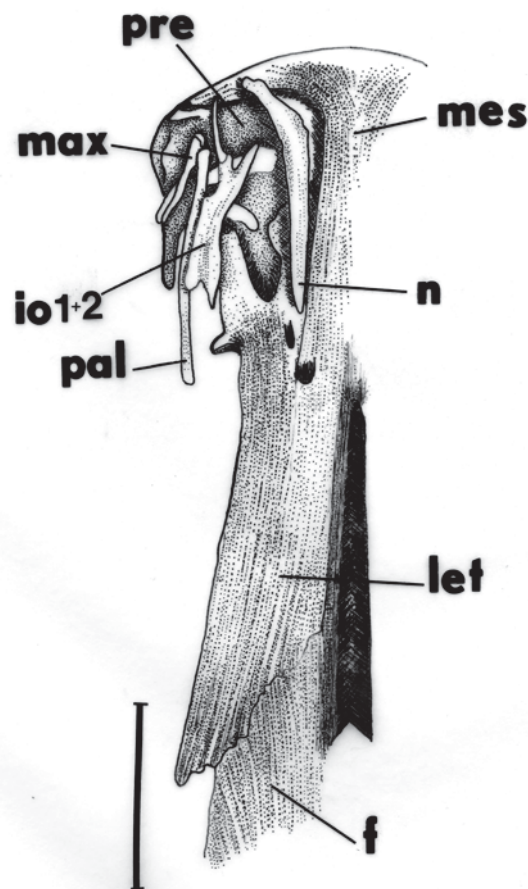


FIGURE 8. Anterodorsal view of the skull of *P. tigrinum*, SIUC 39229. f, frontal; io1+2, infraorbital 1+2 (lacrimal sensu Lundberg & McDade 1986); let, lateral ethmoid; max, maxilla; mes, mesethmoid; n, nasal; pal, palatine; pre, premaxilla. Note the well developed process of the let. Scale 1 cm.

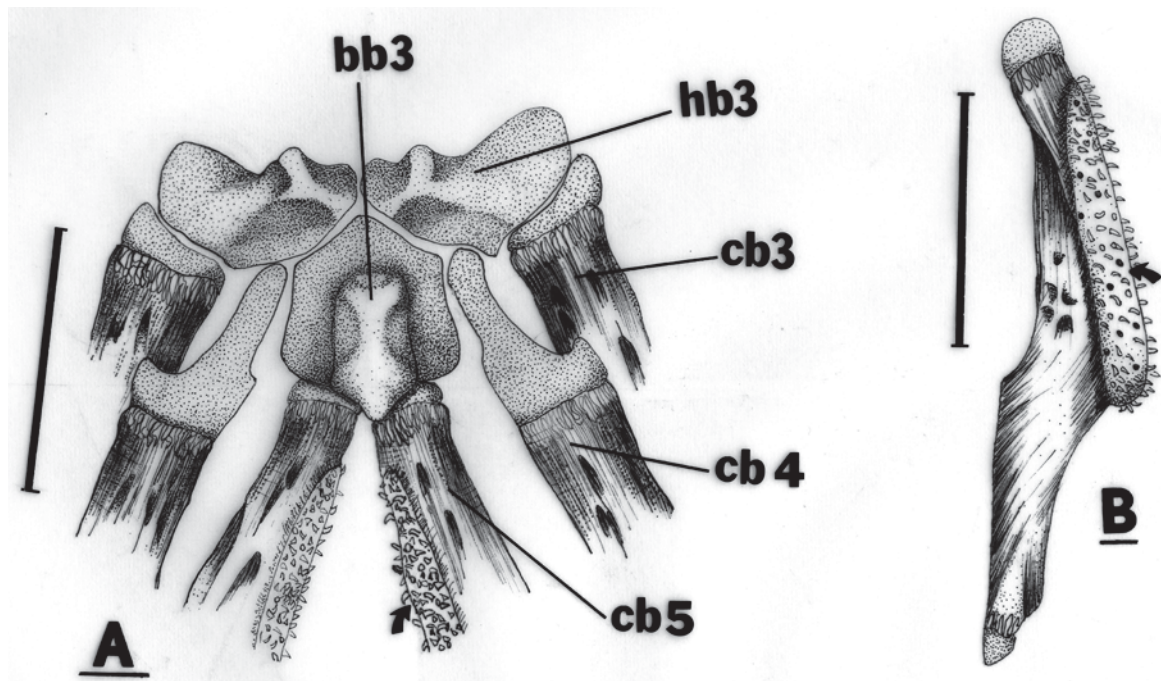


FIGURE 9. Anteroventral elements of the branchial apparatus (A), *P. fasciatum*, ANSP 177346. B, ventral view of ceratobranchial 5, *P. fasciatum*, USNM 225437. bb3, basibranchial 3; cb3, ceratobranchial 3; cb4, ceratobranchial 4; cb5, ceratobranchial 5 and hb3, hypobranchial 3. Curved arrows point to the cb5 tooth patch. Scale 1 cm.

***Pseudoplatystoma fasciatum* (Linnaeus, 1766)**
(Figure 10, Table 1)

Silurus fasciatus Linnaeus, 1766:505. Type locality: Brazil and Suriname. Mees (1974:129), as first revisor, restricted the type locality of *P. fasciatum* to Suriname. Holotype unknown.

Platystoma artedii Günther, 1864:164. Type locality: South America. Type(s): unknown.

Historical review. Linnaeus (1766) described *Silurus fasciatus* based on external morphology, including number of fin spines and rays, pigmentation, shape of the rostrum, and texture of the skin. Linnaeus mentioned in his original description the names of Gronovius and Seba, two renowned cabinet owners (i.e., collectors) at that time. Linnaeus based his description on material owned by one of these gentlemen, apparently Albertus Seba. Engel (1961) and Boeseman (1970) tried to trace the ultimate destination of Seba's zoological material with the intention of helping taxonomists find type specimens. They concluded that only a small part of Seba's original material can be located accurately (Boeseman, 1970). His collections may have found their way to museums in Leningrad, Berlin, Bremen, Stockholm, and The Hague (Boeseman, 1970), as well as London and Paris. We have not been able to locate any type of *Silurus fasciatus*. An English translation of Linnaeus' original description is as follows:

"Posterior dorsal fin adipose. Anal fin with 13 rays, pelvics with 6 and spotted. Dorsal with 7 rays, caudal 17. Lower jaw short, rostrum flat and dark. Head long, flat, round anterior and reaching 1/2 the length of the body. Dorsum with black and white stripes on each side. Abdomen white. All fins sprinkled with black spots. Dorsal fin near the head, adipose near the tail. Habitat: Brazil and Suriname."

Linnaeus considered both Brazil and Suriname as the type locality of his *Silurus fasciatus*. We presume that the locality of Suriname is based directly on the collection that Seba made there in 1758 (Mees, 1974), whereas the reference to Brazil is based indirectly through Seba from Marcgrave (Mees, 1974). We follow Mees (1974:129), the first revisor, in restricting the type locality of *P. fasciatum* to Suriname.

Eigenmann and Eigenmann (1888, 1889) described four subspecies of *P. fasciatum* from the Amazon basin; *P. f. brevifile*, *P. f. nigricans*, *P. f. intermedium* and *P. f. reticulatum*. The allocation and taxonomic status of these names has not been clarified despite their repetition in standard catalogs (see Gosline, 1945; Fowler, 1915; Mees, 1974). Eigenmann and Allen (1942), Ringulet et al., (1967) and Mees (1974) placed these names in the synonymy of *P. fasciatum*. Conversely, we place the following names, *P. fasciatum brevifile*, *P. fasciatum nigricans*, *P. fasciatum intermedium*, in the synonymy of *P. punctifer*, a valid name applied to a species inhabiting the Amazon River (see *P. punctifer* account below). *Pseudoplatystoma fasciatum reticulatum* is elevated herein as *P. reticulatum* for a distinct population that inhabits the Paran- and Amazon rivers (see below).

Neotype: FMNH 116903, 516 mm SL, Linker Coppename River, ca. 1 km downstream from confluence of Midden and Linker Coppename rivers, 4°14'5.6"N, 56°36'5.8"W, Suriname, Ted Jantz et al., 28 February 2004.

Geographic distribution: Guyana region, including the Essequibo and Suriname rivers and their tributaries, in the countries of Guyana, Suriname, and French Guiana (Guyana) (Fig. 11).



FIGURE 10. *Pseudoplatystoma fasciatum* (Linnaeus, 1776), INHS 48973, 516 mm SL.

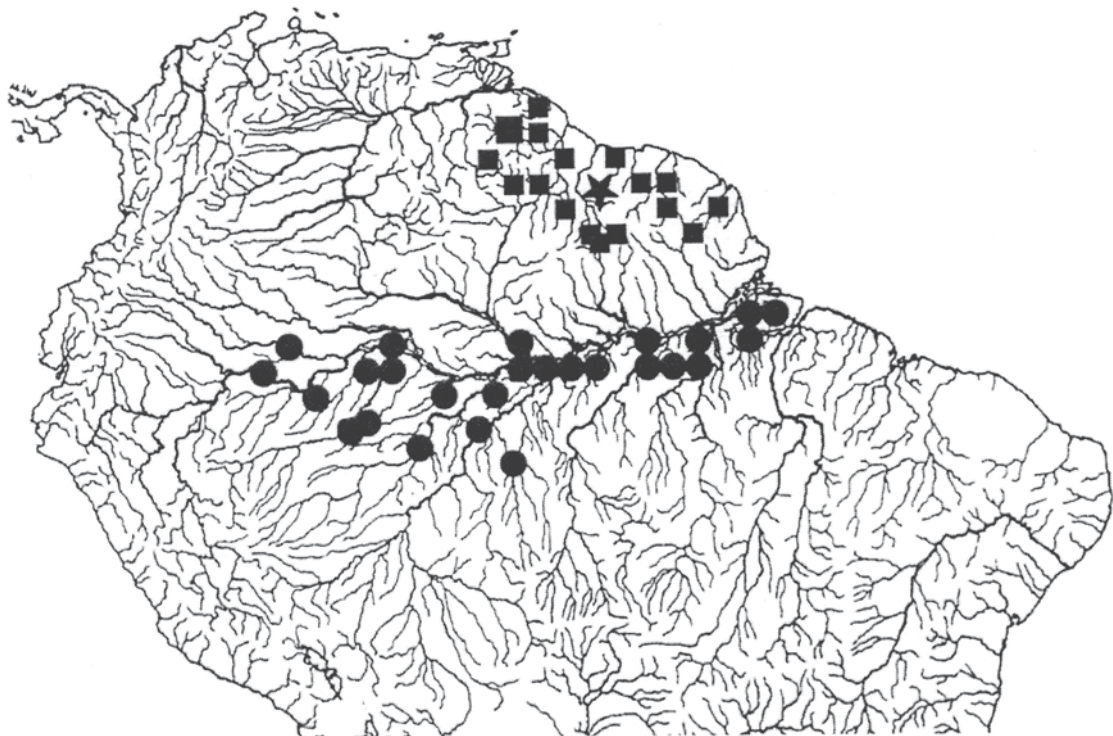


FIGURE 11. Distribution of *Pseudoplatystoma fasciatum* (black squares), neotype is indicated by a star; and *P. tigrinum* (black circles).

Material examined: ANSP 175801, (1), 188 yd. up stream from Essequibo campsite Maipuri, 4°45'43"N, 58°45'52"W, Essequibo River, county of Siparuni VIII-2, Guyana, D. Allicock, 27 January 1997. ANSP

177346, (1), (1 ds), Black Water camp, 4°44'00"N, 58°59'00"W, Siparuni River, Essequibo River, county of Essequibo, Guyana, G. Watkins et al., 6 December 1997. ANSP 8385, (1), Suriname River, Suriname. ANSP 177351, (1), rocky area 200m downstream from Paddle Rock campsite, 4°44'23"N, 58°42'42"W, Essequibo River, Guyana, D. Torres et al., 6 December 1997. BMNH 1866.8.14.159, (1), Suriname, purchased by Damon. BMNH 1971.729.92.93, (2; 1 ds), Karanambo pools, Rupununi River, Guyana, R. H. Lowe-McConnell, 1971. BMNH 1866.8.14.158, (1), Suriname, purchased by Damon. CAS 11626, (2), Rupununi River, Guyana, C. H. Eigenmann, 1908. INHS 48974, (1 ds), Mazaruni–Potaro, 5°59'07.5"N, 58°33'02.9"W, Essequibo River, Guyana, J.W. Armbruster et al., 19–20 October 1998. INHS 48973, (1), large sandbar & small cataract, 31.9 miles SSW Rockstone, 05°31'39.5"N, 58°37'43.6"W, Mazaruni–Potaro, Essequibo River, Guyana, J. W. Armbruster et al., 21 October 1998. NRM 6050, (2), Suriname, Barnett–Lyon 1991. UF 16271, (1), Marowijne River, at Albina, Suriname, Tjon–A–Hie, July–August 1967. USNM 225437, (3; 1 ds), Koekwie creek, 5°31'00"N, 57°10'00"W, Suriname, H. M. Madarie, 15 May 1980.

Diagnosis: A species of *Pseudoplatystoma* distinguished by a combination of the following features: 42–44 vertebrae versus 37–40 in the most similar species, *P. punctifer* (see Tables 1, 5 and 9); vertebral complex supporting Weberian apparatus longer than wide; skull at least 1/6 narrower than in other species; usually 10–11 dark vertical bars, relatively wider than similar species from Amazon River; white vertical bars fewer than black vertical ones; generally, darker dorsally than congeners; pectoral and pelvic fins darker with few or no spots; bars posterior to head and opercle relatively more loop-like than straight; first spinelet of anal fin contacts haemal arch of 24th vertebra; conversely, it contacts haemal arch of 22nd vertebra in *P. punctifer* from Amazon River; last five vertebral centra shorter than in other species.

Description: Maximum size recorded 900 mm TL. Body moderately slender, profile of head an acute triangle, almost flat anteriorly. In dorsal view, head margins almost parallel, widening anteriorly. Anterior margin of mouth rounded, covered by thick skin. Body widest at pectoral fins, and gradually diminishing in width to caudal peduncle. Dorsal margin from dorsal fin to adipose fin somewhat concave, posterior to adipose fin straight. Ventral margin of body straight. Dorsal surface of cranium rough posteriorly with thin skin firmly attached, anterior region smooth with thicker skin. Middle fontanel extending along dorsal surface of head. Anterior nostril tubular, posterior one covered by small triangular flap. Eye dorsolateral, somewhat ovoid or circular at middle of head. Maxillary barbel very long, reaching beyond pelvic fin, dark dorsally, pale ventrally. Anterior ventral chin barbel shorter, 3/4 of the head length, pale. Posterior ventral chin barbel longer, reaching tip of pectoral spine, pale. Opercular margin pale.

Pigmentation somewhat regular in individuals of this species. Head and body dark dorsally and laterally. Dark pigmentation extending to the lateral line. Ventral region of body whitish. Darker bands present as vertical bars or loops. Vertical bars distributed along side posteriorly to pectoral fin and may reach ventral region of body; some of them with pale bars. Loops in area surrounding the dorsal fin. Dorsal fin rays with spots along their length. Adipose fin with small spots. Caudal fin with few spots, usually 29–40. Pectoral and pelvic fins usually dark. A comparison with other species of *Pseudoplatystoma* is in Table 9.

TABLE 1. Descriptive measurements of the body size and shape (in mm), and number of vertebrae for *P. fasciatum*. Number of individuals measured, 23.

Variables	Neotype	mean±SD	range
Standard length	516	294.6±87.2	198.2–546.6
Snout–posterior occipital process	179.7	115.8±28.7	80–197.4
Snout–posterior margin of the opercle	179.7	111.3±29.5	87.3–194.8
Dorsal fin spine length	56.7	33.2±10	18.6–58.3
Pectoral fin spine length	76	45.5±13	27.8–80.3

...continued

TABLE 1. (continued)

Variables	Neotype	mean \pm SD	range
Maxillary barbel length	219	156.1 \pm 29.6	111.3–209.4
Anterior chin barbel length	169.3	132 \pm 20.5	99.8–169.3
Insertion maxillary barbel–eye	72.5	46 \pm 10.5	30.6–72.5
Insertion maxillary barbel–joint pectoral spine	143.5	87 \pm 24.2	58.5–155.4
Insertion maxillary barbel–joint dorsal spine	201.6	122.9 \pm 32.3	83.8–209.8
Eye–joint pectoral spine	80.5	45.8 \pm 14	29.2–84.6
Eye–joint dorsal spine	129.5	76.7 \pm 21.1	52.7–134.4
Joint pectoral spine–joint dorsal spine	90.1	50.9 \pm 14.5	33–90.5
Joint pectoral spine–joint first pelvic ray	128.2	68.5 \pm 22.8	46.1–137.2
Joint pectoral spine–joint last ray of dorsal fin	114	65.7 \pm 18.9	43.2–119.8
Joint dorsal spine–joint first pelvic ray	101.2	50.9 \pm 18.8	34.1–107.5
Dorsal fin base length	38.9	22.3 \pm 7.2	14.2–41.9
Joint first pelvic ray–joint last dorsal fin ray	74.2	36.3 \pm 14.2	25.8–80.5
Joint first pelvic ray–anal fin origin	122.5	69 \pm 19.6	45.4–122.5
Joint first pelvic ray–origin adipose fin	131.8	71.6 \pm 20.4	50.2–131.8
Last dorsal fin ray–anal fin origin	153.9	84.4 \pm 26.2	60.5–153.9
Last dorsal fin ray–adipose fin origin	131	72.6 \pm 20.4	52.9–131
Anal fin origin–adipose fin origin	61.3	32.2 \pm 11.2	20.6–64.7
Anal fin base length	55.5	30.4 \pm 10.1	21.6–55.5
Anal fin origin–adipose fin terminus	62	33.6 \pm 11.1	24.5–66.1
Adipose fin origin–anal fin terminus	67.7	38.7 \pm 13	24–77.6
Adipose fin length	39.2	24.1 \pm 7.9	12.1–39.2
Anal fin terminus–adipose fin terminus	36.6	20.5 \pm 6.7	14.4–36.6
Anal fin terminus–ventral caudal fin origin	17.9	11.4 \pm 3.7	6.9–23.6
Anal fin terminus–dorsal caudal fin origin	34.4	21.3 \pm 5.9	15.9–39.2
Adipose fin terminus–ventral caudal fin origin	46.4	27.4 \pm 7.8	19.4–51.6
Adipose fin terminus–dorsal caudal fin origin	26.2	17.7 \pm 4.4	13.3–31.6
Caudal peduncle depth	31.9	17.9 \pm 5.4	12.6–31.9
Number of vertebra	43	43.2 \pm 0.83	42–44

Pseudoplatystoma tigrinum (Valenciennes, 1840)

(Figure 12, Table 2)

Platystoma truncatum Six & Agassiz, 1829: 27, pl. 13a. Type locality: Brazil, Japer and Solomon. Lundberg & Littmann (2003) considered this name to be a senior synonym of *P. tigrinum*, based on the original description, plate, and locality. These authors retained the younger name *P. tigrinum* for purposes of stability. There has been virtually no use of *P. truncatum* since its original description, and it is treated here as a *nomen oblitum* (*sensu* Lundberg & Littmann, 2003).

Platystoma tigrinum Valenciennes in Cuvier & Valenciennes, 1840:10 [8 of Strasbourg Deluxe ed.], pl. 422. Type locality: Brazil. Holotype: MNHN A. 9354, (mounted and stuffed).

Platystoma punctatum Valenciennes in Cuvier & Valenciennes, 1840: 20 [15 of Strasbourg Deluxe ed.]. Type locality: unknown.

Geographic distribution: Amazon River, Brazil, Colombia, Ecuador, Perú, and Venezuela (Fig. 11).



FIGURE 12. *Pseudoplatystoma tigrinum* (Cuvier & Valenciennes), holotype, MNHN A-9354. Photo by M. Jégu (MNHN).



FIGURE 13. Caudal fin of *P. tigrinum*, MCP 21028. Scale 5 cm.



FIGURE 14. Caudal fin of *P. punctifer*, INHS 38840. Scale 5 cm.

Type locality: Amazon River, no precise location

Material examined: MNHN a-9354, (holotype), 900 mm SL, Amazon River, Brazil, Geoffroy Saint-Hilaire, 1840. ANSP 103927, (1), Iquitos market, 3°46'00"S, 73°15'00"W, Amazon River, department of Loreto, Perú, E. Huggins, 19 June 1968. ANSP 138995, (1), Marañon River, near Iquitos within one mile of central station, Amazon drainage, department of Loreto, Perú, Catherwood Expedition, October 1955. CAS 133400, (1), Amazon River, Perú. CAS 136185, (1), Amazon River. CAS 6379, (1), Negro River, near Manaus, Amazon River, state of Amazonas, Brazil, W. J. Holl. CAS 78413, (1), Santarem market, Amazon River, state of Para, Brazil, C. Ternetz, September 1924. CAS 18290, (1), mouth of Pacaya drainage near Breaña, Amazon River, department of Loreto, Perú, F. M. Anderson, 1915. INHS 43959, (1), Pampa Chica, 4.54 km W center of Iquitos, bearing, 3°45'08"S, 73°17'0.1"W, Nanay River, Amazon River, department of Loreto, Perú, M. H. Sabaj et al., 27 July 1997. INHS 54783, (1), Oxbow lake, floodplain along S bank of the Marañon River due S of Nauta, 4°30.6'S, 73°34.1'W, department of Loreto Perú, M. H. Sabaj et al., 4 August 1999. MCP 21028, (4), lago marginal of the Amazon River, Ilha de São Miguel, 1°56'S, 54°44'W, Brazil, R. B.

Oliveira, 26 November 1997. SIUC 39756, (1), Marañon River, Cocha (Oxbow lake) on the floodplain along the south bank of the Marañon River, 4°30.6'S, 73°34.1'W, department of Loreto, Perú, M. H. Sabaj et al., 4 August 1999. SIUC 26721, (1), mercado Belén in Iquitos, Loreto, Perú. SIUC 39299, (3 ds), purchased in mercado Belén in Iquitos, department of Loreto, Perú, J. G. Stewart, July 1999. SIUC 50354, (9 ds), mercado Belén in Iquitos, department of Loreto, Perú, J.G. Stewart, July–August 2001. SIUC 42551, (1), Playa Pampachica, barrio of Iquitos, 3°45'31"S, 73°16'W, Nanay River, Amazon River, department of Loreto, Perú, J. G. Stewart et al., 7 August 1999. SIUC 26892, (2), old channel of the Ucayali River, Amazon River, mercado Nauta, captured ca. 20 km E, department of Loreto, Perú, B M. Burr et al., 13 July 1994. USNM 306825, (1), Ressaca Da Ilha de Marchantaria, Amazon River, Brazil, P. Bayley, 19 Sept. 1978.

Diagnosis: A species of *Pseudoplatystoma* distinguished by a combination of the following features: presence of loop-like bands connecting to, or extending to, dorsal region and continuing onto other side of body; loop-like bars form cells as noted in the original description (Cuvier & Valenciennes, 1840). This unique feature allowed for the specific epithet of "tigrinum" because of the evident resemblance to the "Royal Tiger" (see Cuvier & Valenciennes 1840, p. 11); adipose fin with small spots and some loop-like bands; no discrete dark spots on side of body.

Description: Maximum size recorded 1300 mm TL. Head moderately narrow with a long fontanel extending from mesethmoid to supraoccipital. Body widest measurement at origin of dorsal fin. Loops covering sides and top of body and not extending beyond middle lateral region of body. No spots, straight or loop-like bars on dorsal region of head. Pigmentation on ventral region of body ranging from whitish to yellowish. Spots on dorsal fin rays relatively larger than other species. Spots on the caudal fin more numerous (50–60 in *P. tigrinum*, 21–45 in *P. punctifer*; Figs. 13 and 14). Additional differences are described and compared with the other species in Table 9. Color and pattern of adults are shown in Fig. 15.



FIGURE 15. *Pseudoplatystoma tigrinum* (above) and *P. punctifer* (below) from Amazon River, near Iquitos, Perú, June 1994. Photo by Brooks M. Burr.

TABLE 2. Descriptive measurements of the body size and shape (in mm), and number of vertebrae for *P. tigrinum*. Number of individuals measured, 20.

Variables	mean±SD	range
Standard length	274.2±60.6	191.1–384.8
Snout–posterior occipital process	110.1±22	79.9–153.2
Snout–posterior margin of the opercle	106±20.2	77.2–148.2
Maxillary barbel length	102.2±18.7	77.3–137.1
Anterior chin barbel length	110.3±20.6	70.1–144.9
Insertion maxillary barbel–eye	42.6±8.4	32–58.6
Insertion maxillary barbel–joint pectoral spine	84.3±16.9	61.7–117.3
Insertion maxillary barbel–joint dorsal spine	118.8±24.4	169–184.7
Eye–joint pectoral spine	44.9±8.6	33–62.7
Eye–joint dorsal spine	75.8±16	54.4–110.4
Joint pectoral spine–joint dorsal spine	50.4±10.6	36.1–76.7
Joint pectoral spine–joint first pelvic ray	65.4±15.7	42.6–95.1
Joint pectoral spine–joint last ray of dorsal fin	68.4±15.3	46.4–98.8
Joint dorsal spine–joint first pelvic ray	51±12.2	33.3–76.2
Dorsal fin base length	26.5±6.6	17–38.8
Joint first pelvic ray–joint last dorsal fin ray	37.3±9.4	26–59.3
Joint first pelvic ray–anal fin origin	63.1±15	42.6–93.5
Joint first pelvic ray–origin adipose fin	67.8±16.2	50.5–104.9
Last dorsal fin ray–anal fin origin	75.2±18.7	48.6–115.9
Last dorsal fin ray–adipose fin origin	62.2±18.1	40–98.4
Anal fin origin–adipose fin origin	33.2±8.3	21.2–51.2
Anal fin base length	26.5±7	22.1–37.3
Anal fin origin–adipose fin terminus	33.4±8.2	23.4–54.3
Adipose fin origin–anal fin terminus	37.9±8.7	27.2–59.7
Adipose fin length	23.5±4.8	17.3–36.5
Anal fin terminus–adipose fin terminus	19.7±4.9	14.6–31.1
Anal fin terminus–ventral caudal fin origin	12.4±2.5	9–18.2
Anal fin terminus–dorsal caudal fin origin	21.9±4.8	14.6–31.8
Adipose fin terminus–ventral caudal fin origin	26.1±5.8	18.1–38.3
Adipose fin terminus–dorsal caudal fin origin	15.7±3.6	11.1–22.8
Caudal peduncle depth	18.6±4.3	12.8–28.9
Number of vertebrae	35.6±0.69	34–36

***Pseudoplatystoma corruscans* (Spix & Agassiz, 1829)**

(Figure 16, Table 3)

Platystoma corruscans Spix & Agassiz, 1829:26 [pl. 13]. Type locality: in Flumine S. Francisci (Brazil). Holotype: whereabouts unknown. As *Sorubim caparary* on plate.

Sorubim caparary Spix & Agassiz, 1829: pl. 13. Type locality: in Flumine S. Francisci

(Brazil). Holotype: whereabouts unknown. Name available from plate.

Platystoma coruscans Valenciennes in Cuvier and Valenciennes, 1840:17 (p. 13 in the Strasbourg deluxe edition]. Type locality: unknown.

Silurus macrocephalus Larrañaga, 1923: 386. Type locality: Uruguay. Lundberg & Littmann (2003) stated this name corresponds to *Silurus mangrullo* on p. 377, as name only (see Devincenzi 1926: 310, 322).

Neotype: MCP 14071, (1), 700 mm SL. São Francisco River, Minas Gerais, Tres Marias e Pirapora, 18°13'S, 45°15'W, state of Minas Gerais, Brazil, Y. Sato, November 1987.



FIGURE 16. *Pseudoplatystoma coruscans* (Spix & Agassiz, 1829), neotype, MCP 14071, 700 mm. Scale 15 cm.



FIGURE 17. Distribution of *Pseudoplatystoma coruscans* (black circles), neotype is indicated by a cross; and *P. orinocoense* (black squares), holotype is indicated by a star.

Geographic distribution: Paraná River and São Francisco River (Fig. 17) in the countries of Argentina, Brazil, Paraguay, and Uruguay.

Type locality: No precise location in the original description. Spix and Agassiz (1829) reported the locality as Flumine S. Francisci Brasiliae mediae as the habitat of the species.

Material examined: ANSP 46327, (1 ds), Buenos Aires, Argentina, H. W Fowler, 1916. BMNH 1878–10298, (1), La Plata River, La Plata, Buenos Aires, Argentina, W. White, 1878. BMNH 1934–820113120, (6; 2 ds), Paraguay River, near Asunción, Paraná River, Paraguay, G. Schouten, 1934. CAS 76846, (2), Paraguay River, tributary Paraná River, Asunción, Paraguay, J. D. Anisits, March 1900. CAS 152882, (1), Pirapora, São Francisco River, state of Minas Gerais, Brazil, G. S. Myers et al., 12 October 1942. CAS 52883, (1), Pirapora, São Francisco River, state of Minas Gerais, Brazil, G. S. Myers et al., 12 October 1942. FMNH 58037, (2), Joazeiro, São Francisco River, state of Bahia, Brazil, J. D. Haseman, 11/28/1907. MCP 14114, (1), São Francisco River, Minas Gerais, between Tres Marias and Pirapora, 18°13'S, 45°15'W. MCP 14070, (1), São Francisco River, Minas Gerais, Tres Marias e Pirapora, state of Minas Gerais, Brazil, Y. Sato, November 1987. MCZ 7316, (1), below the falls, probably near Pirapora, São Francisco River, state of Minas Gerais, Brazil, F. C Hartt, 1867. NRM 31891, (1), Paraguay River at club Puente Remanso, 25°11'3"N, 57°32'W, purchased from local fishermen, Paraguay, B. Delling et al., 21 October 1994. SIUC 33082, (2; 1 ds), Porto Rico island, Paraná River 22°45'S, 53°15'W, state of Paraná, Brazil. C. S. Pavanelli, 20 July 1998. USNM 181766, (1), Asunción bay, Paraguay River, near Asunción, Paraguay, C. J. Brown, 27 December 1956. USNM 181765, (2), Asunción bay, Paraguay River, near Asunción, Paraguay, C. J. Brown, 10 January 1957. USNM 181774, (2), Asunción bay, Paraguay River, near Asunción, Paraguay, C. J. Brown, 20 December 1956. USNM 002114, (1), Paraguay (data on precise location is missing).

Diagnosis: A species of *Pseudoplatystoma* distinguished by a combination of the following features: body covered by large spots distributed regularly in six to eight rows from posterior margin of opercle to tail; pale vertical bars on sides of body varying from 4–13; adipose fin containing 5 to 10 or no spots; caudal fin with few spots, some individuals with no spots on the ventral lobe; 44–47 vertebrae (see Table 9); surrounding region of both ventral and dorsal procurent caudal rays with no spots.

Description: Maximum recorded length 1140 mm TL. *Pseudoplatystoma corruscans* has the same profile as other members of the *P. fasciatum* clade. Body somewhat stout. Viewed dorsally, widest measurement at level of dorsal fin origin, decreasing gradually to tail. Lateral sides of head almost parallel. Pigmentation dark brownish on top and sides of body and head, with spots distributed in rows. A row of spots may be present below lateral line. Pale vertical bars on lateral region of body from opercle flap to caudal peduncle, varying from 4–13 (modally 4–7). No straight vertical or loop-like dark bars. Dorsal region of head with no loops, a few individuals with spots. Dorsal fin rays bearing small spots. Pectoral fin dark and with no spots. Pelvic fin pale, and between 3–6 spots. Anal fin variable, pale, dark, or spotted. A comparison with other species is in Table 9. Color and pattern of adults are shown in Fig. 18.

Remarks: Swarça et al. (2005) reported the karyotype ($2n = 56$) for two populations (Paraná and Paraguay rivers) of *P. corruscans* in Brazil and noted differences in karyotype structures that might suggest cryptic species masquerading under one name. We have been unable to find trenchant phenotypic differences in specimens of *P. corruscans* examined from several locations in separate drainage systems and have no additional morphological data that might support the notion of cryptic species.

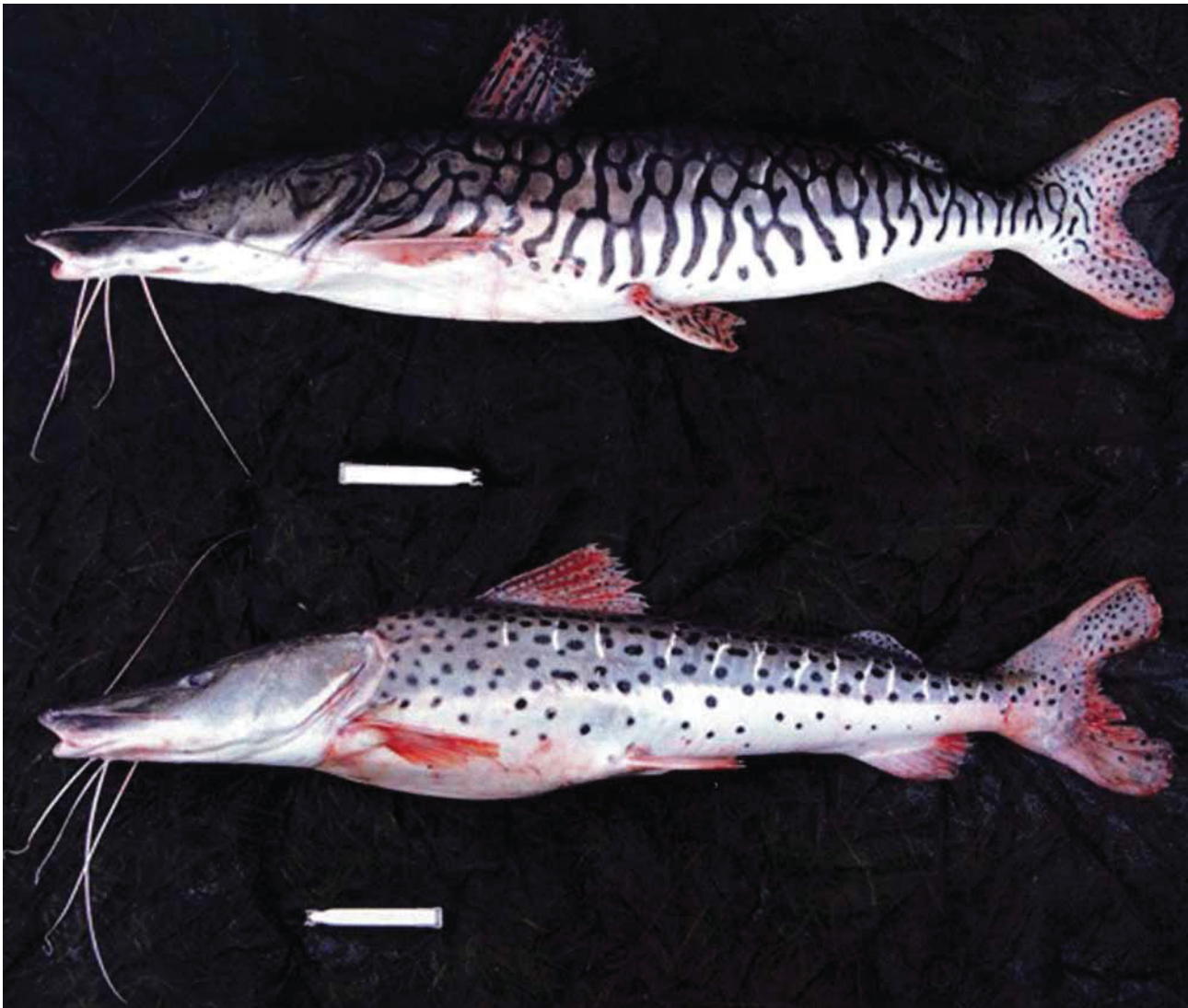


FIGURE 18. *Pseudoplatystoma reticulatum* (above) and *P. corruscans* (below) from Paraná River, near Esquina, Argentina. April 2005. Photo by Mark. H. Sabaj.

TABLE 3. Descriptive measurements of the body size and shape (in mm), and number of vertebrae for *P. corruscans*. Number of individuals measured, 25.

Variables	Neotype	mean \pm SD	range
Standard length	700	299.2 \pm 81.2	187.2–437.1
Snout–posterior occipital process	222	120.3 \pm 29.1	73.3–165
Snout–posterior margin of the opercle	222	116.1 \pm 28.8	72.1–157.4
Dorsal fin spine length	67	34.5 \pm 9	20.9–49.6
Pectoral fin spine length	90	46.3 \pm 13.1	25–59.3
Maxillary barbel length	190	122.6 \pm 23.5	82.1–157.4
Anterior chin barbel length	80	109.1 \pm 16.4	115–129.2
Insertion maxillary barbel–eye	85	46.1 \pm 11.4	29.3–63.4
Insertion maxillary barbel–joint pectoral spine	183	91.3 \pm 24.2	56.9–129.2
Insertion maxillary barbel–joint dorsal spine	165	129.3 \pm 31.5	79.6–174

...continued

TABLE 3. (continued)

Variables	Neotype	mean \pm SD	range
Eye–joint pectoral spine	111	49.2 \pm 13.8	30.4–72.1
Eye–joint dorsal spine	186	83.2 \pm 22	51.6–116
Joint pectoral spine–joint dorsal spine	123	55.3 \pm 14.1	35.1–74.7
Joint pectoral spine–joint first pelvic ray	170	72.2 \pm 20.7	42.6–100.1
Joint pectoral spine–joint last ray of dorsal fin	160	71.4 \pm 18.6	44.5–97.6
Joint dorsal spine–joint first pelvic ray	169	65.6 \pm 16	33–79.6
Dorsal fin base length	63	25.6 \pm 7.1	15–35.4
Joint first pelvic ray–joint last dorsal fin ray	143	41.1 \pm 11.9	24.1–55.4
Joint first pelvic ray–anal fin origin	162	70.1 \pm 20	41.9–103.8
Joint first pelvic ray–origin adipose fin	190	74.1 \pm 20.8	45.4–99.6
Last dorsal fin ray–anal fin origin	244	86.7 \pm 25.3	50.4–126.6
Last dorsal fin ray–adipose fin origin	190	70.4 \pm 21.4	38.6–101.6
Anal fin origin–adipose fin origin	98	35 \pm 10.1	22–46.7
Anal fin base length	68.3	30.8 \pm 7.1	21.2–43.9
Anal fin origin–adipose fin terminus	88.4	36.3 \pm 9.4	24.9–48.1
Adipose fin origin–anal fin terminus	102	42 \pm 10.8	28.3–58.7
Adipose fin length	52.7	27.1 \pm 7.6	17.8–35.8
Anal fin terminus–adipose fin terminus	52.7	22.2 \pm 6.3	13.9–31.7
Anal fin terminus–ventral caudal fin origin	29.4	12.5 \pm 4.5	6.7–19.3
Anal fin terminus–dorsal caudal fin origin	49.4	22.7 \pm 6.4	12.7–32.5
Adipose fin terminus–ventral caudal fin origin	78.6	29.4 \pm 9	16.9–42.9
Adipose fin terminus–dorsal caudal fin origin	46.5	18.7 \pm 6.3	12.7–32.8
Caudal peduncle depth	44.4	19.7 \pm 5.8	12–27.4
Number of vertebrae		45.3 \pm 0.81	44–47

***Pseudoplatystoma orinocoense* n. sp.**

(Figure 19, Table 4)

Geographic distribution: Orinoco River basin, Venezuela (Fig. 17).**FIGURE 19.** *Pseudoplatystoma orinocoense* n. sp., holotype, INHS 35880, 489.7 mm SL. Scale 15 cm.

Holotype: INHS 35880, 489.7 mm SL., near mouth of El Caujavito River, tributary of Orinoco River, southeast of Cajarote, 7°41' N, 66°21'W, state of Guarico, Venezuela, D. Taphorn et al., 12 January 1995.

Paratypes: AMNH 96663, (1), 59 nautical miles from buoy, small caño emptying into caño Curiapo, 8°36'24"N, 61°00'00"W, Orinoco River, territorio federal delta Amacuro, Venezuela, Eastward et al., 19 November 1979. AMNH 96662, (1), very small primary caño on isla Guacujana south shore, 8°36'N, 60°56'W, territorio federal delta Amacuro, Orinoco basin, Venezuela, Eastward et al., 19 November 1979. ANSP 166790, (1), El Almacen L. Maldonado, 8°6'N, 63°45'50"W, Orinoco River, state of Bolivar, Venezuela, M. Rodriguez, 18 April 1988. USNM 233830, (2), small caño on W side of caño Paloma, 8°29'N, 61°25'W, Orinoco River, territorio federal delta Amacuro, Venezuela, J. Lundberg, 21 February 1978.

Material examined: ANSP 166466, (1), lago Merecure, 8°12'55"N, 63°17'25"W, Orinoco River, city of Bolivar, state of Bolivar, Venezuela, M. Rodriguez, 13 April 1988. ANSP 162391, (2), Orinoco River, at El Burro, 6°12'N, 67°26'W, state of Amazonas, Venezuela, B. Chernoff et al., 16 November, 1985. ANSP 166790, (1), lagoon El Maldonado, Site El Almacen, 8°6'N, 63°45'50"W, Orinoco River, state of Bolivar, Venezuela, M. Rodriguez, 26 April, 1988. AMNH 77819, (1), caño Caicara, at bridge on road from Mantecal, 7°22'N, 69°21'W, Orinoco River, state of Apure, Venezuela, San Fernando fish station technicians, 24 January 1983. INHS 29298, (1), lagoon Curita, 8°9'30"N, 63°35'55"W, Orinoco River, state of Anzoategui, Venezuela, M. Rodriguez, 28 May 1987. INHS 61938, (1), San Bartolo River at Bartolena ranch, Guarico River, 7°59'20"N, 66°39'W, Orinoco River, state of Guarico, Venezuela, D. C. Taphorn et al., 24 January 1986. INHS 34505, (1), San Bartolo River, Natural Park Aguaro, Guariquito River, 8°4'14"N, 66°40'50"W, Orinoco River, state of Guarico, Venezuela, D. C. Taphorn et al., 8 January 1995. INHS 62069, (1 ds), Guariquito River, 7°54'40"N, 66°33'40"W, Orinoco River, state of Guarico, Venezuela, D. C. Taphorn et al., 24 January 1986. INHS 29853, (1 ds), Apure River, Orinoco River, 2 km N of La Ve, 7°33'95"N, 69°15'48"W, state of Apure, Venezuela, L. M. Page et al., 23 January 1993. MCNG 33258, (1), laguna El Potrero (Las Majadas), 7°36'40"N, 64°49'50"W, Orinoco River, state of Bolivar, Venezuela, M. Rodriguez, 15 January 1987. MCNG 1629, (1 ds), hatu El Frio, Apure River, 7°45'S, 67°55'0"W, Orinoco River, state of Apure, Venezuela, D. Taphorn et al., 10 February 1979. MCNG 36049, (1 ds), Sipao River, 6 km up stream from mouth, Orinoco River, district of Sucre, state of Bolivar, Venezuela, D. Rodriguez, 23 March 1997. MCNG 38851, (1 ds), Payara River front of mouth of Manglar River, Orinoco River, district of Penalver, state of Apure, Venezuela, D. Arana et al., 12 December 1997. UF 80868, (1), laguna Chiriguare, Orinoco River, state of Portuguesa, Venezuela, D. Taphorn et al., 3 April 1984. UF 78077, (1), 2 km N of San Fernando de Apure, between km markers 305 & 306, state of Guarico, Orinoco River, Venezuela, Taphorn et al., 22 March 1981. UF 80651, (1), Guasimito River, tributary Guanare River, SE of Arismendi at Chalana site 8°20'55"N, 68°2'20"W, Orinoco River, state of Barinas, Venezuela, D. Taphorn et al., 6 April 1984. UMMZ 211346, (2), tidal stream, 49 nautic miles, 8°38'N, 60°50'W, Orinoco River, Venezuela, J. Baskin and D. Stewart, 20 November 1979. USNM 258157, (1), Apure River, side channel along dike opposite to municipal slaughter house, 7°35'0"N, 67°29'0"W, state of Apure, Orinoco River, Venezuela, technicians of Apure fisheries, 25 January 1983. USNM 260211, (1), caño W to highway from Calabozo San Fernando, about 35 km south of fundo Masaguaral (caño Falcon), 8°14'0"N, 67°35'0"W, Orinoco River, state of Guarico, Venezuela, R. P. Vari et al., 20 January 1983. USNM 258152, (1), same as 260211. USNM 258155, (2), small caño of Apure River, 7°53'0"N, 67°29'0"W, Orinoco River, state of Apure, Venezuela, technicians at Apure Fisheries, 21 January 1983.

Diagnosis: A species of *Pseudoplatystoma* distinguished by a combination of the following features: well defined straight vertical bars along side of body, longer than those of *P. fasciatum* and *P. punctifer*; bars connecting to, or extending to, the dorsal region and continuing onto other side of body; vertical bars of anterior region straight and extending below dorsolateral dusky area; usually no spots below lateral line, some individuals with two or three spots; 39–41 vertebrae.

Description: Maximum recorded length 489.7 mm TL. Body moderately stout, profile of head an acute triangle or pointed toward lips, almost flat anteriorly. Head margins somewhat parallel when viewed dorsally.

Mouth rounded with mesethmoid, premaxilla, and lower jaw covered interiorly by thick skin. Viewed dorsally, body widest measurement at pectoral fins, and tapers gradually toward caudal peduncle. Dorsal margin from dorsal fin to adipose fin straight, dorsal margin posterior to adipose fin straight. Ventral margin from mouth to origin of anal fin straight. Posterior surface of head with thin skin leaving almost exposed grooves and roughness on the posterior region of cranium. Median fontanel short and covered by rough and thick skin. Anterior nostrils tubular and whitish, posterior ones with a whitish triangular flap.

Eyes in dorsolateral position, ovoid and located at middle length of head. Maxillary barbels long, reaching origin of pelvic fins, their color blackish dorsally and yellowish ventrally. Chin barbels short in adults, not reaching beyond pectoral fin origin, longer in juveniles (<250 mm), extending beyond tip of pectoral spine. Opercle with pale flap on its margin.

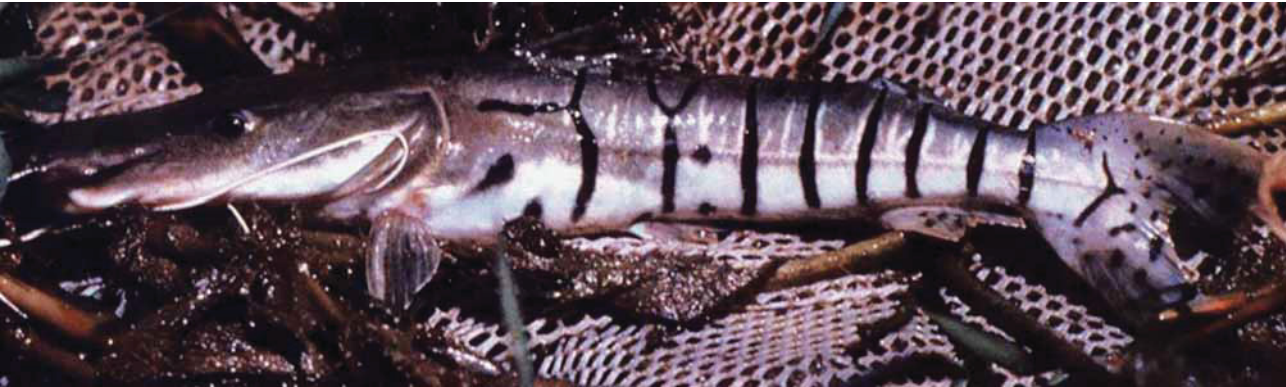


FIGURE 20. *Pseudoplatystoma orinocoense*, San Bartolo River (Orinoco River), Venezuela, January 1986. Photo by Mark H. Sabaj.

Head and rest of body dark dorsal and laterally. Dark pigmentation reaching lateral line. Some individuals pale others yellow ventrally. Vertical bars distributed along side of body. Number of bars greater than in congeners from Guyana (*P. fasciatum*) (about 10 bars) and Amazon (*P. punctifer*) (about 11 bars) and varying between 10 to 14 with an average of 12. Last bar on caudal fin often boomerang-like. Generally, dark bars accompanied by whitish bars. Few individuals with one or two dark loops on posterior region of head. Dorsal fin with few spots on spine and rays. Adipose fin with few spots decreasing in size toward the margin. Pectoral and pelvic fins dark dorsally, pale ventrally. A comparison with other species is presented in Table 9. Color and pattern of adults are shown in Fig. 20.

Etymology: The specific epithet *orinocoense* refers to the Orinoco River, Venezuela, the drainage in which this species is endemic.

TABLE 4. Descriptive measurements of the body size and shape (in mm), and number of vertebrae for *P. orinocoense*. Number of individuals measured, 27.

Variables	Holotype	mean±SD	range
Standard length	489.7	300.3±93.5	208.2–524.2
Snout–posterior occipital process	170.3	119.1±32.8	87–207.9
Snout–posterior margin of the opercle	180	116.3±33.4	83.3–202.6
Dorsal fin spine length	61.2	37.1±11.8	22.2–64.7
Pectoral fin spine length	74.9	48.3±14.8	33.5–84.3
Maxillary barbel length	190.7	138.7±36.4	81.7–242.3

...continued

TABLE 4. (continued)

Variables	Neotype	mean \pm SD	range
Anterior chin barbel length	174.1	121.8 \pm 32.8	90–212.6
Insertion maxillary barbel–eye	69.6	45.9 \pm 12.9	32.5–80.1
Insertion maxillary barbel–joint pectoral spine	136.5	88.4 \pm 25.6	62–154.3
Insertion maxillary barbel–joint dorsal spine	214.9	127.3 \pm 38.1	90.5–222.2
Eye–joint pectoral spine	75.1	49.6 \pm 15.6	33.3–86.7
Eye–joint dorsal spine	125.4	80.5 \pm 23.3	57.3–140.2
Joint pectoral spine–joint dorsal spine	89.1	54.2 \pm 15.6	38.5–94.6
Joint pectoral spine–joint first pelvic ray	121.3	70 \pm 23.5	44.5–122.2
Joint pectoral spine–joint last ray of dorsal fin	118.3	71.7 \pm 21.7	50.6–125.4
Joint dorsal spine–joint first pelvic ray	96.7	54.0 \pm 17.9	35.1–94.2
Dorsal fin base length	41.6	26.2 \pm 8.0	18–45.6
Joint first pelvic ray–joint last dorsal fin ray	71.3	39.7 \pm 12.5	27.4–69.3
Joint first pelvic ray–anal fin origin	124.3	71.8 \pm 24.1	47.5–125.9
Joint first pelvic ray–origin adipose fin	131.4	75.1 \pm 24.2	57.1–131
Last dorsal fin ray–anal fin origin	136.8	83.7 \pm 27.1	57.2–146.3
Last dorsal fin ray–adipose fin origin	109.9	69.2 \pm 22.5	47.8–120.8
Anal fin origin–adipose fin origin	60.6	35.4 \pm 11.1	24.1–61.9
Anal fin base length	48	32.2 \pm 11.6	22.2–68.9
Anal fin origin–adipose fin terminus	61.5	36.5 \pm 11.2	25.2–63.8
Adipose fin origin–anal fin terminus	70.7	42.7 \pm 12.9	28.5–74.6
Adipose fin length	42.5	26.6 \pm 8.0	17.4–46.5
Anal fin terminus–adipose fin terminus	36.8	21.7 \pm 6.6	14.6–37.9
Anal fin terminus–ventral caudal fin origin	20.9	11.1 \pm 3.7	7.5–20.9
Anal fin terminus–dorsal caudal fin origin	37	21.7 \pm 6.9	14.2–37.7
Adipose fin terminus–ventral caudal fin origin	49.9	27.9 \pm 9.0	18–48.7
Adipose fin terminus–dorsal caudal fin origin	30.1	17.1 \pm 5.7	9.7–30.1
Caudal peduncle depth	31.6	19.4 \pm 5.8	13.1–33.7
Number of vertebrae	40	40.07 \pm 0.47	39–41

***Pseudoplatystoma punctifer* (Castelnau, 1855)**

(Figure 21, Table 5)

Platystoma punctifer Castelnau, 1855: 40, plate 19 (Fig. 2). Type locality: de l'Amazone [Brazil]. Holotype: MNHN 1582.

Pseudoplatystoma fasciatum intermedium Eigenmann & Eigenmann, 1888:138. Type locality: Obidos [Brazil]. Holotype: MCZ 7321.

Pseudoplatystoma fasciatum brevifile Eigenmann & Eigenmann, 1889: 31. Type locality: Goyaz [Brazil]. Holotype: MCZ 7317.

Pseudoplatystoma fasciatum nigricans Eigenmann & Eigenmann, 1889:31. Type locality: Xingu [Brazil]. Syntypes: MCZ 7301, 7311 (2).

Geographic distribution: Amazon River in Bolivia, Brazil, Colombia, Ecuador, Perú, and Venezuela (Fig. 22)

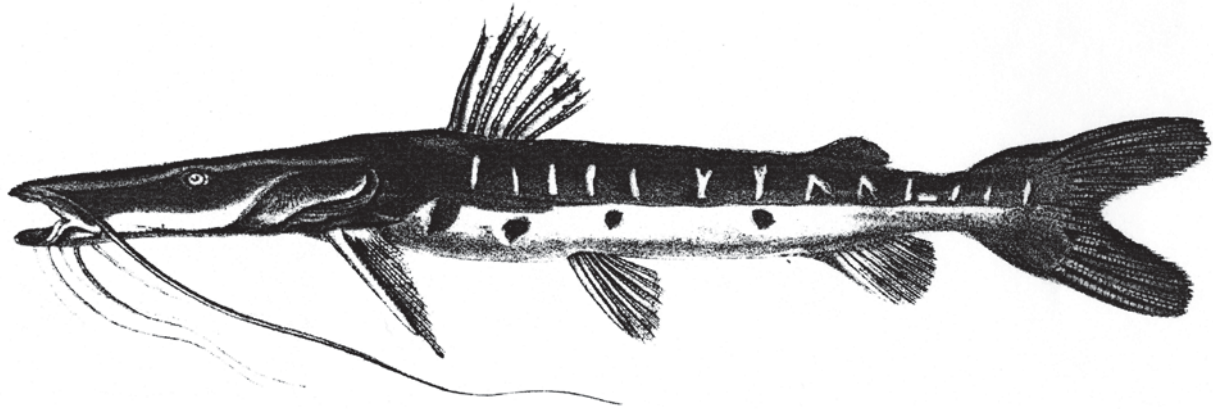


FIGURE 21. *Pseudoplatystoma punctifer* (Castelnau, 1855), holotype, MNHN 1582. Illustration from original description.



FIGURE 22. Distribution of *Pseudoplatystoma punctifer* (black circles); and *P. metaense* (black squares), type locality is indicated by a star.

Material examined: Holotype MNHN 0000–1582, 500 mm SL, Amazon River (no precise location). ANSP 95870, (1), Parnahyba River, Teresina, state of Piauí, Brazil, R. von Ihering, 1936. ANSP 147886, (1), Nanay River tributary of Amazon River, Iquitos, Perú, C. C. Chaplin et al., 10 December 1955. ANSP 142538, (1), lago Tupuhumaro, Puerto Maldonado, Las Piedras River, 12°33'0"S, 69°13'0"W, Amazon River, state of Madre de Dios, Perú, R. Horwitz, 16 August 1977. ANSP 165080, (1), quebrada of Yanayacu River, tributary Marañón River, 4°42'0"S, 74°17'0"W, department of Loreto, Perú, P. Fromm et al., 21 August 1989. AUM 23585, (1 ds, head), lago Tumi Chucua, Beni River, Madeira River, department of Beni, Bolivia, 11°07'S, 66°11'W. C. K. Swing, 16 November 1981. BMNH 18491187, (2), Amazon River, Loreto, Perú. CAS 117202, (1), caño del Chanco, near Pebas, Amazon River, department of Loreto, Perú, W. G. Scherer, 1 August 1941. CAS 76671, (2), Peru, W. R. Allen, 1920. CAS 18372, (1), Puinahua River, mouth of Pacaya River, Amazon River, Perú, W. R. Allen, September 1920. CAS 45788, (1), Santarem market, Amazon River,

state of Para, Brazil, C. Ternetz, September 1924. CAS 78407, (1), locality of Contamana, Ucayali River, Amazon River, department of Ucayali, Perú, W. R. Allen, July 1920. CAS 18301, (1), Sanatarem market, Amazon River, state of Para, Brazil, C. Ternetz, August 1924. CAS 133399, (1 c&s), Ampiyacu River, Amazon River, department of Loreto, Perú, W. G. Scherer, 26 September 1937. CAS 213339, (1 c&s), lago Cashiba, Amazon River, department of Loreto, Perú, W. R. Allen, 3 August 1920. CU 53649, (1), lagoon on island at the mouth of Ica River in Porto America in the Amazon River, state of Amazonas, Brazil, J. C. Bradley, 19 January 1920. CU 53650, (1), Iquitos fish market, Amazon River, department of Loreto, Perú, J. C. Bradley, 8 May 1920. INHS 39770, (1), lago Pabellon, 3°44'8"S, 72°25'03"W, 57.1 mi E Iquitos, Orosa River, tributary Amazon River, department of Loreto, Perú, M. Sabaj et al. 15 August 1996. INHS 68071, (1), lake Marchantaria, Camaleão inlet, Marchantaria island, about 12 km S Manaus, Amazon River, state of Amazonas, Brazil, P. B. Bayley, 28 September 1978. INHS 43667, (1), Ullpa-Caño and caño Morena, Itaya River tributary of Amazon River, near Belén, Iquitos, 3°46'20"S, 73°14'17"W, department of Loreto, Perú, M. Sabaj and J. W. Armbruster, 23 July 1997. INHS 38840, (1), purchased at Iquitos fish market, Amazon River, department of Loreto Perú, 10 August 1996. MCP 19764, (1 ds), Amazon River at Manaus, 3°18'S, 58°46'W, state of Amazonas, Brazil, R. E. Reis, 14 October 1994. MCP 18192, (1), (1 ds) lake of Araguaia River, near city of Luís Alves, 13°14'S, 50°35'W, Amazon River, state of Goiás, Brazil, F. Garro, September 1994. MCZ 7310, (1), Poti River, tributary Parnaíba River, at Teresina, 5°5'S, 42°49'W, state of Piauí, Brazil, O. John, December 1865. MCZ 7313, (1), Solimoes River at Tefé, 3°24'S, 64°45'W, Amazon River, state of Amazonas, Brazil, L. Agassiz et al., October 1865. MCZ 7312, (1), Jutai River, 2°43'S, 66°57'W, Amazon River, state of Amazonas, Brazil, W. James, September 1865. NRM 13436, (2), Belén fish market at Iquitos, Amazon River, department of Loreto, Perú, S. Kullander et al., 23 August 1983. SIUC 39825, (1), north side of large island across Marañon River, town of Mazán, 3°28'98"S, 73°05'203"W, Río Amazonas, state of Loreto, Perú, J. G. Stewart et al., 30 July 1999. SIUC 26720, (1), mercado Belén in Iquitos, Amazon River, department of Loreto, Perú, B. M. Burr et al., 1996. SIUC 26893, (1), mercado Nauta, captured ca. 20 km E Nauta near confluence with channel, Amazon River, department of Loreto, Perú, B. M. Burr et al., 13 July 1994. SIUC 39890, (1 ds), Tamshiyacu River at the confluence with Amazon River, 4°01'S, 73°8'W, province of Maynas, department of Loreto, Perú, J. G. Stewart et al., 28 July 1999. SIUC 39301, (6 ds), mercado Belén in the city of Iquitos, department of Loreto, Perú, purchased by J. G. Stewart, July 1999. UF 8810, (1 ds). UF 117983, (1 ds), Amiria reserve, province of Maynas, Amazonas River, department of Loreto, Perú, J. Albert, August 2000. UF 117984, (1 ds), Amiria reserve, province of Maynas, Amazon River, department of Loreto, Perú, J. Albert, August 2000. UF 8809, (1 ds). UMMZ 217861, (1), lago do Reis, Ilha do Careiro, Amazon River, state of Amazonas, Brazil, 14 January 1983. USNM 305806, (1), camp Trapiche, 400 M río abajo of Curiraba River, Beni River, Amazon River, Bolivia, H. Ortega et al., 1 August 1988. USNM 284814, (4), fish market at Iquitos, Amazon River, department of Loreto, Perú, R. Vari and H. Ortega, 19 August 1986. USNM 179502, (1), whereabouts in the Amazon River. USNM 306832, (1), ressaca da Ilha de Marchantaria, Brazil, P. Bayley, 19 September 1978. USNM 041505, (1), Teffe, Brazil. USNM 320611, (1), Matos River below road crossing, 48 Km E. San Borja, province of Beni, Bolivia, W. C. Starnes et al., 28 August 1987.

Diagnosis: A species of *Pseudoplatystoma* distinguished by a combination of the following features: 37–40 vertebrae; dark vertical bars straight; vertical bars on one side no connecting across dorsum with bars on the opposite side. Free, discrete dark spots present below lateral line; first anal spinelet contacts haemal arch of vertebral centra number 22; adipose fin with fewer spots (6 to 8) than sister species, *P. fasciatum* (10 to 11).

Description: Maximum recorded length 1400 mm TL. Anterior region of head pointed. Widest measurement at dorsal origin. Ventral region of body forming a straight line. Profile posterior to the dorsal fin decreasing gradually in depth toward the adipose and caudal fins. Dark pigmentation in dorsolateral region and extending to lateral line. Ventral to lateral line, pale, varying from whitish to yellowish. Dark straight vertical bars with pale short lines attached. No loops in specimens smaller than 500 mm SL. Some (3) individuals with spots on dorsal region of head. Caudal, dorsal, and anal fins with few spots. Dusky pigmentation on

dorsal region of pectoral fin, pale ventrally. Posterodorsal region of head rough, smooth anteriorly. Anterior nostrils tubular and whitish/yellowish, posterior one with a flap with a whitish edge. Maxillary barbels long, extending beyond pectoral fin, posterior mental barbels (or chin barbels) reaching pelvic fin origin. A comparison with other species is in Table 9. Color and pattern of adults are shown in Fig. 15.

TABLE 5. Descriptive measurements of the body size and shape (in mm), and number of vertebrae for *P. punctifer*. Number of individuals measured, 41.

Variables	mean±SD	range
Standard length	266.3±88.2	177.2–578.8
Snout–posterior occipital process	107.3±30.6	73.5–213.5
Snout–posterior margin of the opercle	102.9±30.9	70.8–211.6
Dorsal fin spine length	30.5±10.2	19.5–65.7
Pectoral fin spine length	41.2±13.9	27.1–88.6
Maxillary barbel length	134.1±37.9	86.2–248.5
Anterior chin barbel length	114.5±31	66.3–207.1
Insertion maxillary barbel-eye	41.2±12.3	23.3–82.7
Insertion maxillary barbel-joint pectoral spine	79±24.1	59–162.4
Insertion maxillary barbel-joint dorsal spine	115.3±36.6	77.8–234.7
Eye–joint pectoral spine	41.8±13.7	30.8–90.3
Eye–joint dorsal spine	70.9±22.4	37.6–149.8
Joint pectoral spine-joint dorsal spine	47.3±16	29.9–105.1
Joint pectoral spine-joint first pelvic ray	63±23.2	37.9–151.2
Joint pectoral spine-joint last ray of dorsal fin	61.2±21.2	38.9–136.6
Joint dorsal spine-joint first pelvic ray	46±18.4	30.6–111
Dorsal fin base length	20.5±7.3	13.9–45.5
Joint first pelvic ray-joint last dorsal fin ray	33.8±13.9	20.9–82.3
Joint first pelvic ray-anal fin origin	64.3±22.1	41.7–139.5
Joint first pelvic ray-origin adipose fin	66.3±23	42.6–149.6
Last dorsal fin ray-anal fin origin	77.7±29.2	50.3–169.7
Last dorsal fin ray-adipose fin origin	67.9±24.9	41.7–146.5
Anal fin origin-adipose fin origin	28.7±10.9	19.1–67.5
Anal fin base length	24.8±8	15.5–55
Anal fin origin-adipose fin terminus	29.5±10.1	18.8–68.6
Adipose fin origin-anal fin terminus	34.3±11.8	23.7–76.6
Adipose fin length	20.8±7.4	13.7–46.3
Anal fin terminus-adipose fin terminus	18.2±6.4	12.2–40.4
Anal fin terminus-ventral caudal fin origin	11.2±4	5.7–22.6
Anal fin terminus-dorsal caudal fin origin	19.5±6.5	12.3–40
Adipose fin terminus-ventral caudal fin origin	24.8±8.7	15.4–54.3
Adipose fin terminus-dorsal caudal fin origin	16.6±6.3	9.9–37.2
Caudal peduncle depth	16.5±5.4	11–34.8
Number of vertebrae	39.4±0.83	37–40

***Pseudoplatystoma metaense* n. sp.**

(Figure 23, Table 6)

Geographic distribution: Orinoco River, Colombia and Venezuela (Fig. 22).

Holotype: ANSP 146858, 528 mm SL. Metica River, ca 1.5 km E of Rajote (Plancha 267), 3°56'N, 73°3'W, Meta River, department of Meta, Colombia, W. G. Saul et al., 16 March 1973.

Paratypes: ANSP 149541, (2), Orinoco River inlet below Barrancas, 141 nautic miles, upstream from sea buoy, Venezuela 8°43'N, 62°08'W, R. V. Eastward, 17 February 1978. ANSP 128135, (1), hacienda Mozambique; lake Mozambique, W side near end, 3°58'N, 73°04' W, Meta River, Orinoco River, department of Meta, Colombia, J.E. Bohlke et al., 29 March 1971.



FIGURE 23. *Pseudoplatystoma metaense*, n. sp., holotype, ANSP 146858, 527.9 mm SL. Scale 10 cm.

Material examined: AMNH 96661, (2), between Puerto Ordaz and Barrancas at los Castillos de Guyana, isla Japatupa in an isolated laguna, 8°31'36"N, 62°26'42"W, Orinoco River, Venezuela, C. Eastwaed et al., 10 November 1976. ANSP 146858, (1), Metica River, ca 1.5 km. E of Rajote (Plancha 267), 3°56'N, 73°3'W, Meta River, Orinoco River, department of Meta, Colombia, W. Saul and W. Smith-Vaniz, 16 March 1973. ANSP 149541, (2 ds), Orinoco River inlet below Barrancas, 141 nautic miles, upstream from sea buoy, Venezuela 8°43'N, 62°08'W, R. V. Eastward, 17 February 1978. ANSP 166447, (1), Cabruta; laguna Larga II, Orinoco River, estado de Guarico, Venezuela, M. Rodriguez and A. Martinez, 11 January 1988. CAS 162518, (1), whereabouts in the Orinoco River, Venezuela. CAS 164380, (2), whereabouts in the Orinoco River, Venezuela. CAS 211347, (2), caño tributary of Orinoco River, nautic miles 92, estado Delta Amacuro, Venezuela. CAS 64945, (1), south of Bruzual, Prestamo on east side of highway, Orinoco River, estado de Apure, Venezuela, D. Taphorn et al., 18 February 1981. INHS 35798, (1), laguna caño Largo, 8°14'50"N, 63°15'55"W, Orinoco River, estado de Bolivar, Venezuela, M. Rodriguez, 27 May 1987. INHS 35880 & 35881, (2), SE, El Carote, near mouth of Caujauto River, 7°41'N, 66°21'W, Orinoco River, estado de Guarico, Venezuela, D. Taphorn et al., 12 January 1995. MCNG 38744, (1), Cojedes River, Orinoco River, estado de Cojedes, Venezuela, N. Hurtado, February 1994. MCNG 31287, (1 ds), laguna Tineo, 8°11'25"N, 63°28'20"W, Orinoco River, distrito Independencia, estado Anzoategui, Venezuela, M. Rodriguez, 28 March 1988. UF 80652, (1), Guasimito River, tributary Guanare River, 8°20'55"N, 68°2'20"W, Orinoco River, estado de Barinas, Venezuela, D. Taphorn et al., 6 April 1984. UMMZ 211348, (2), delta Amacuro, inlet of caño Araguaito on north side of Orinoco River, estado delta Amacuro, Venezuela, E. Marsh et al., 14 November 1979. USNM 258155, (1 ds), Apure River, side channel of the Riverca, 5 km W of San Fernando de Apure, 7°53'N, 67°29'W, Orinoco River, estado de Apure, Venezuela, technicians at Apure fisheries, 21 January 1983. USNM 258157, (2), side channel along dike opposite municipal slaughter house, 7°35'N, 67°29'W, Apure River, tributary of Orinoco River, estado de Apure, Venezuela, technicians at Apure fisheries, 25 January 1983. USNM 233935, (1), caño Limón on north side of the river, opposite los Castillos, between Pt. Ordaz and Barrancas, 162.1 nautic miles from sea buoy, 8°31'48"N, 62°25'24"W, Orinoco River, Venezuela, Marsh et al., 10 November 1979.

Diagnosis: A species of *Pseudoplatystoma* distinguished by a combination of the following features: dark

spots randomly distributed over dusky region on body (this pattern has been regarded mistakenly as the spotted condition of *P. corruscans*, and consequently, these two species often have been confused); side of body with few (no more than 5) straight dark vertical bars; fewer (2 or 3) loop-like bars than in *P. tigrinum*; adipose fin with fewer spots than in *P. tigrinum* (8–10, in *P. tigrinum*, 5–7 in *P. metaense*); surrounding areas over dorsal procurent caudal rays also with fewer spots than in *P. tigrinum*; (8–10 in *P. tigrinum*, 5–8 in *P. metaense*); 35 vertebrae; pectoral and pelvic fins pale with no dusky pigmentation.

Description: Maximum recorded length 528 mm TL. *P. metaense* has a narrow head and flat snout, somewhat expanded anteriorly. Viewed laterally, widest measurement at dorsal fin origin. Body tapers in depth gradually toward the tail. Dark pigmentation on dorsum and lateral sides from head to tail. Spots and vertical lines over the dusky region, sometimes a few spots on lateroventral white region. Rays of dorsal fin with few spots, spine pale with no spots. Pelvic fins pale and lacking spots, anal fin pale with few spots. Caudal fin with many spots (compare Figs. 14 and 15). No loop-like or spots on dorsal region of head. A long groove or fontanel extends from middle length of mesethmoid to middle length of supraoccipital. Posterior process of supraoccipital with a conspicuous crest. Surface of the head rough posteriorly with a transverse groove. Surface of snout with reticulating/dendritic prolongations of the lateral line system as well as on cheeks, all over surface and posteriorly to the opercle. Maxillary barbels short, not reaching beyond opercle flap. Short posterior mental barbels extend beyond pectoral girdle.

Etymology: The specific epithet *metaense* refers to the type locality, Meta River, a tributary of the Orinoco River in Colombia and Venezuela.

TABLE 6. Descriptive measurements of the body size and shape (in mm), and number of vertebrae for *P. metaense*. Number of individuals measured, 26.

Variables	Holotype	mean±SD	range
Standard length	518.2	349±104.1	226.1–559
Snout-posterior occipital process	198.9	135.3±38.8	62.6–203.1
Snout-posterior margin of the opercle	191.6	132.1±36.3	88–196.6
Dorsal fin spine length	67	47.5±14.2	25–74.3
Pectoral fin spine length	84.1	56.2±16.5	33–87.4
Maxillary barbel length	164.2	126.1±22.7	84.8–167.7
Anterior chin barbel length	155.4	130.7±28.3	74–189.2
Insertion maxillary barbel-eye	76.9	52.8±14.2	35.1–80.6
Insertion maxillary barbel-joint pectoral spine	151.2	106.5±28.7	70.1–157.6
Insertion maxillary barbel-joint dorsal spine	219.7	148.7±40.6	105–223.8
Eye-joint pectoral spine	82.1	58.7±16.6	36.9–89.6
Eye-joint dorsal spine	130.4	94.7±25.3	65–142.8
Joint pectoral spine-joint dorsal spine	92.8	62.8±18	40.6–95.5
Joint pectoral spine-joint first pelvic ray	123.9	82.5±27	52.8–135.7
Joint pectoral spine-joint last ray of dorsal fin	100.8	86±26.1	55.4–135.4
Joint dorsal spine-joint first pelvic ray	76	65.7±21.5	38.1–106.7
Dorsal fin base length	40.1	34.4±10.9	22.2–55.6
Joint first pelvic ray-joint last dorsal fin ray	55.9	47.1±15.7	25.3–73.5
Joint first pelvic ray-anal fin origin	95.4	80.4±26.5	51.2–134.6
Joint first pelvic ray-origin adipose fin	100.4	85.1±27.7	55.3–148.1

...continued

TABLE 6. (continued)

Variables	Neotype	mean \pm SD	range
Last dorsal fin ray-anal fin origin	109.4	95.7 \pm 31.6	58.6–154.3
Last dorsal fin ray-adipose fin origin	93	78.6 \pm 26.9	49–130.9
Anal fin origin-adipose fin origin	48.3	44.1 \pm 14.5	27.3–73.1
Anal fin base length	42.6	35.5 \pm 11.1	19.7–54.9
Anal fin origin-adipose fin terminus	51.7	44.6 \pm 14.4	25.4–75.8
Adipose fin origin-anal fin terminus	54.9	49.9 \pm 14.8	25.4–75.8
Adipose fin length	37	32.9 \pm 9.7	28.1–77.7
Anal fin terminus-adipose fin terminus	28.3	25.7 \pm 8.3	18.5–51.7
Anal fin terminus-ventral caudal fin origin	15.3	17 \pm 7.6	14.2–43.3
Anal fin terminus-dorsal caudal fin origin	31	28.4 \pm 9.3	8.9–32.6
Adipose fin terminus-ventral caudal fin origin	36.5	33.0 \pm 9.9	19.3–53.2
Adipose fin terminus-dorsal caudal fin origin	23.3	19.4 \pm 6.2	10.5–29.4
Caudal peduncle depth	28.7	24.8 \pm 7.7	15.1–39.7
Number of vertebrae	35	35 \pm 0	35

***Pseudoplatystoma magdaleniatum* n. sp.**

(Figure 24, Table 7)

Geographic distribution: Magdalena River drainage, including Cauca River, Colombia (Fig. 25).**Holotype:** CAS 19165, 421.5 mm SL. Soplaviento, town on the dique de Cartagena road to Calamar, Magdalena River, department of Bolivar, Colombia, C. H. Eigenmann, 11 January 1912.**Paratypes:** FMNH 56278, (1), Calamar, Magdalena River, north of Colombia, C. H. Eigenmann, 16/18 January 1912. FMNH 59324, (1), Soplaviento, Magdalena River, north of Colombia. C. H. Eigenmann, 13 January 1912.**Material examined:** CAS 15047, (1), Apulo, Magdalena River, department of Santander, Colombia, M. Gonzales. CAS 150405, (1), near junction of Samana and La Miel rivers, near city of La Dorada, Magdalena River, departamento of Caldas, Colombia, T. White and J. N. Reynolds, 27 February 1950. CAS 13233, (1), Puerto Berrio, Cienega, Magdalena River, Colombia. C. H. Eigenmann, 1913. ICN–MHN uncatalogued (1 ds), Magdalena River, Colombia, R. Royero, 2002.**FIGURE 24.** *Pseudoplatystoma magdaleniatum* n. sp., holotype, CAS 19165, 421.5 mm SL. Scale 15 cm.



FIGURE 25. Distribution of *Pseudoplatystoma magdaleniatum* (black circles), type locality indicated by a star; and *P. reticulatum* (black squares), type locality indicated by a cross.

Diagnosis: A species of *Pseudoplatystoma* distinguished by a combination of the following features: rays on dorsal and ventral lobes of caudal fin with fused branches or not separated as in other species of *Pseudoplatystoma*; wide, straight, dark vertical bars on sides; no loops on nape and associated areas; dorsal and ventral regions of pectoral fin pale with no spots; dorsal fin with few or no spots (sometimes 5 spots); 43 vertebrae; adipose fin with few large spots (6–7 spots); areas surrounding the procurent rays of dorsal fin without spots; posterior region of the metapterygoid wider than in other species, forming a depression or notch in the dorsal margin of the suspensorium (Fig. 26A).

Description: Maximum recorded length 1000 mm TL. Body elongate and slim. Anterior margin of head rounded. Posterior dorsal region of head rough and with distinctive grooves; supraoccipital process with a crest; median fontanel short, extending from middle length of mesethmoid to connection of frontals to supraoccipital. No rough skin on fontanel. Anterior nostrils short. Body pigmentation dark on dorsal and lateral sides with no clear delimitation between pale and dusky areas. Dark bars extending beyond the lateral line with pale bars. Bars connecting dorsally with those on the opposite side. Region posterior to dorsal fin with some median dark bars. Adipose fin with few and large spots. See Table 9 for a comparison with other species.

Etymology: Named for the Magdalena River, Colombia, to which this species is endemic.



FIGURE 26. A, suspensorium of *P. magdaleniatum*, ICN–MHN (uncatalogued). B, suspensorium of *P. punctifer*, ICN–MHN (uncatalogued). Arrow points to the notch in the dorsal margin of the suspensorium in *P. magdaleniatum*. Photo by R. Royero.

TABLE 7. Descriptive measurements of the body size and shape (in mm), and number of vertebrae for *P. magdaleniatum*. Number of individuals measured, 7.

Variables	Holotype	mean±SD	range
Standard length	421.6	423.7±77.2	351.8–535.6
Snout–posterior occipital process	161.7	161.2±27.3	135.6–200.5
Snout–posterior margin of the opercle	156.2	157.1±29.3	130.5–200.6
Dorsal fin spine length	53	53±8.3	45.6–65.9
Pectoral fin spine length	63.9	63±8	52.3–73.1
Maxillary barbel length	202.9	193.4±41.6	146.2–250
Anterior chin barbel length	124.5	122.1±21.6	68.7–142
Insertion maxillary barbel–eye	55.1	54.8±7.8	47.1–65.4
Insertion maxillary barbel–joint pectoral spine	123.4	130.5±20.6	103–158.7
Insertion maxillary barbel–joint dorsal spine	171.7	173.5±31.6	145.6–223
Eye–joint pectoral spine	72.4	73.6±16.3	56.7–95.5
Eye–joint dorsal spine	116.5	117.1±21.7	97.4–150.6
Joint pectoral spine–joint dorsal spine	69.5	69±12.3	59.4–87.7
Joint pectoral spine–joint first pelvic ray	86.5	96.3±26.9	75–137.5
Joint pectoral spine–joint last ray of dorsal fin	92.7	92.6±18.7	77–120.9
Joint dorsal spine–joint first pelvic ray	64.6	67.9±11.5	56.5–82.7
Dorsal fin base length	37.3	36.7± 5.7	30.9–44.8
Joint first pelvic ray–joint last dorsal fin ray	46.3	47.5±7	41.3–55.8
Joint first pelvic ray–anal fin origin	104.6	100.9±15.2	89.3–124.6
Joint first pelvic ray–origin adipose fin	102.7	104.7±18	86–134.4
Last dorsal fin ray–anal fin origin	120.7	117.4±19.3	97.2–143.2

...continued

TABLE 7. (continued)

Variables	Neotype	mean \pm SD	range
Last dorsal fin ray–adipose fin origin	97.3	99.9 \pm 18.4	78.3–123.3
Anal fin origin–adipose fin origin	42.2	43 \pm 6.7	36.9–51.2
Anal fin base length	43.1	43.4 \pm 7.4	36.4–53.9
Anal fin origin–adipose fin terminus	50.6	51.2 \pm 8.9	41.7–63.4
Adipose fin origin–anal fin terminus	56.1	55 \pm 9.6	47.4–69.9
Adipose fin length	46.2	41.1 \pm 6.9	32.7–50
Anal fin terminus–adipose fin terminus	24.7	26.5 \pm 4.7	22.4–34.7
Anal fin terminus–ventral caudal fin origin	22.6	22 \pm 3.7	20.4–26.6
Anal fin terminus–dorsal caudal fin origin	33.8	33.7 \pm 5.7	29.3–41.5
Adipose fin terminus–ventral caudal fin origin	33.6	36.9 \pm 7.1	32.6–47.5
Adipose fin terminus–dorsal caudal fin origin	24.6	27 \pm 6	27.2–35.8
Caudal peduncle depth	23.4	24.7 \pm 4.2	21.2–30.8
Number of vertebrae	43	43 \pm 0	43

***Pseudoplatystoma reticulatum* (Eigenmann & Eigenmann, 1889)**
(Figure 27, Table 8)

Pseudoplatystoma fasciatum reticulatum Eigenmann & Eigenmann, 1889:30. Type and Locality: Negro River [Brazil]. Holotype: MCZ 23813.

Geographic distribution: Central Amazon and Paraná River in Argentina, Bolivia, Brazil, Paraguay, and Uruguay (Fig. 25).

Holotype: MCZ 23813, 605 mm SL, Negro River, between Manaus and Moura, 3°8'N, 59°55'W, state of Amazonas, Brazil, N. Dexter and L. Agassiz, 12 October 1865.

Material examined: ANSP 53867, (2), Descalvados, Matto Grosso, Paraguay River. J. A. Rehn, September 1931. BMNH 1934–820113120, (2), Paraguay River, near Asunción, Paraguay, purchased by G. Schouten, 1934. FMNH 96053, (1), Delcalvados, Matto Grosso, Paraguay River, Brazil, Schmidt et al., 1926. FMNH 58039, (1), Puerto Suárez, Bolivia, J. D. Haseman, 6 May 1909. FMNH 72656, (1), Aregua, Paraguay River, 7 April 1909. USNM 181766, (1), Paraguay River, Asunción bay, near Asunción, Paraguay, C. J. Brown, 27 December 1956. USNM 002114, (1), Paraguay River.



FIGURE 27. *Pseudoplatystoma reticulatum* (Eigenmann & Eigenmann, 1889), NRM 14068, 460.1 mm SL. Scale 10 cm.

Diagnosis: A species of *Pseudoplatystoma* distinguished by a combination of the following features: loop-like dark bars forming a reticulating pattern, never straight as in *P. fasciatum*, *P. orinocoense* and *P. punctifer*; dark, loop-like bars join those in the dorsal region of the body forming distinct cells; longer loop-like dark bars, extending far below the lateral line; head shows either spots or loops; 42–43 vertebrae; anal fin always with spots; no clear demarcation between dark dorsal and pale ventral regions; lower jaw pointed.

Description: Maximum recorded length 605 mm TL. Viewed dorsally, head somewhat pointed on the anterior margin; dorsal lip expanding toward the midline. Generally, individuals are stout. Dark pigmentation on dorsal and lateral region of body extends below lateral line. No clear delimitation between pale and dark pigmentation of body. Dark loop-like bars all over the dark area from posterior opercular flap to caudal peduncle. Head with spots and bars from tip to nape. Dorsal fin spine and rays with spots. Anal fin spotted on each individual examined. Pectoral and pelvic fins dark dorsally, pale ventrally, with few spots; some individuals with dusky posterior margins on pectoral fins. Adipose fin with few spots (10–13 spots). Area around dorsal procurent caudal rays with spots, ventral procurent caudal rays without spots. See Table 9 for a comparison with other species. Color and pattern of adults are shown in Fig. 18.

Etymology: The specific epithet *reticulatum* refers to the reticulating pigmentation pattern.

TABLE 8. Descriptive measurements of the body size and shape (in mm), and number of vertebrae for *P. reticulatum*. Number of individuals measured, 10.

Variables	Holotype	mean±SD	range
Standard length	605	363.7±140.0	193.6–579
Snout-posterior occipital process	250	143.2±49.6	80.6–211.3
Snout-posterior margin of the opercle	238	139.0±47.4	78.7–204.4
Dorsal fin spine length	58	40.3±13.6	22.9–59.9
Pectoral fin spine length	94	54.7±18.3	32.4–83.1
Maxillary barbel length	219	169.3±40.6	120–219.4
Anterior chin barbel length	195	143.7±25.7	109.6–177.2
Insertion maxillary barbel-eye	104	55.7±18.1	32.7–80.3
Insertion maxillary barbel-joint pectoral spine	183	106.9±18.1	59.9–160.8
Insertion maxillary barbel-joint dorsal spine	260	150±52.4	82.7–219.6
Eye-joint pectoral spine	91	58.3±21.4	31.5–89.2
Eye-joint dorsal spine	164	95.3±34.2	51.4–127.4
Joint pectoral spine-joint dorsal spine	114	63.6±23.3	33.2–93.8
Joint pectoral spine-joint first pelvic ray	164	82.0±33.0	34–135.1
Joint pectoral spine-joint last ray of dorsal fin	153	77.3±26.1	41.7–108.7
Joint dorsal spine-joint first pelvic ray	119	65.2±26.5	31.6–101.4
Dorsal fin base length	54	27.7±10.4	13.8–42
Joint first pelvic ray-joint last dorsal fin ray	88	48.5±20.1	22.4–73.2
Joint first pelvic ray-anal fin origin	153	85.3±34.5	44–140.3
Joint first pelvic ray-origin adipose fin	170	90.2±34.9	46.7–138.6
Last dorsal fin ray-anal fin origin	194	102.4±41.0	51.9–163.5
Last dorsal fin ray-adipose fin origin	178	87.2±35.7	44.5–140.8
Anal fin origin-adipose fin origin	68	45.5±17.4	20.8–63.1

...continued

TABLE 8. (continued)

Variables	Neotype	mean±SD	range
Anal fin base length	61	36.1±12.9	20.2–55.7
Anal fin origin-adipose fin terminus	71	41.5±15.2	22.7–64.2
Adipose fin origin-anal fin terminus	84	48.4±17.9	27.8–74.2
Adipose fin length	52	28.4±9.5	17.6–44
Anal fin terminus-adipose fin terminus	44	25.6±9.8	12.9–37.9
Anal fin terminus-ventral caudal fin origin	27	17.3±6.3	8.4–28.1
Anal fin terminus-dorsal caudal fin origin	43	26.9±9.9	13.1–39.5
Adipose fin terminus-ventral caudal fin origin	61	34.8±13.1	17.6–54.2
Adipose fin terminus-dorsal caudal fin origin	43	23.7±8.8	11.9–34.8
Caudal peduncle depth	37	22.9±9.5	10.8–37
Number of vertebrae	42	42.25±0.43	42–43

Key to the species of *Pseudoplatystoma*

1. (a) More than 50 spots in the caudal fin, anterior projection on the lateral ethmoid (Fig. 8), ventral flange on the anterior process of the interopercle, tooth patch of infrapharyngobranchial # 5 covers only the dorsal region of that bone, width of the lateral ethmoid at the joint with infraorbital 1+2 (io 1+2) very narrow (as much as 3/4 narrower than the width of the lateral ethmoid in *P. fasciatum*, *P. punctifer*, *P. orinocoense*, *P. reticulatum*, *P. corruscans* and *P. magdaleniatum* 2
 (b) Fewer than 45 spots in the caudal fin, no anterior projection on the lateral ethmoid, absence of ventral flange on the anterior process of the interopercle, tooth patch of infrapharyngobranchial # 5 covers dorsal and extends over 2/3 of ventral region of that bone, wide lateral ethmoid at the joint with infraorbital 1+2 (io1+2). 3
2. (a) Dark loops or reticulated bars along the side of the body (Fig. 15), no spots on the lateral region of the body *P. tigrinum* (Amazon River and tributaries).
 (b) Dark vertical bars and few spots (no more than 10) randomly distributed along the side of the body. *P. metaense*, n. sp. (Orinoco River and tributaries in Colombia and Venezuela).
3. (a) Nuchal plate # 1 expanded, posterior region of the metapterygoid wider than in the other species *P. magdaleniatum*, n. sp. (Magdalena and Cauca rivers, north-central region of Colombia).
 (b) Nuchal plate # 1 reduced and not expanded 4
4. (a) Thick loop-like or reticulated bars on the side of the body, dark loop-like bars join those in the dorsal region of the body forming distinct cells, dorsal region of head has either loops or spots *P. reticulatum* (Amazon and Paraná rivers)
 (b) No loop-like bars on the side of the body; spots or pale vertical bars common and located close to the dark vertical bars 5
5. (a) Spots distributed regularly in six to eight rows from the posterior margin of the opercle to the tail *P. corruscans* (Paraná and São Francisco rivers, in Argentina, Paraguay, Uruguay and southeast Brazil).
 (b) Straight dark vertical bars along the side of the body 6
6. (a) Well-defined straight dark vertical bars on the side of the body, longer than those in *P. fasciatum* and *P. punctifer*, vertical bars of the anterior region also straight and extending below the dorsolateral dusky area, bars do not form spots as seen on other species, usually no spots below lateral line, some individuals

- have two or three spots *P. orinocoense*, n. sp. (Orinoco River, and its tributaries in Colombia and Venezuela).
- (b) Dark vertical bars form spots below the lateral line, well-defined pale vertical bars, distinct demarcated boundary between the dusky dorsolateral and pale ventrolateral regions of the body 7
7. (a) First spinelet of the anal fin contacts the haemal arch of the 24th vertebra, some specimens have spots below the laterodorsal dark region, 43–45 vertebrae. *P. fasciatum* (Rupununi, Essequibo and Suriname rivers).
- (b) First spinelet of the anal fin contacts the haemal arch of the 22nd vertebra, 37–40 vertebrae, free discrete dark spots below the laterodorsal dark region (Fig. 15), adipose fin with fewer (6 or 8) spots than on *P. fasciatum* *P. punctifer* (Amazon River and tributaries).

Discussion

Unrecognized species of *Pseudoplatystoma* have been included under the names *P. fasciatum* and *P. tigrinum* for decades. Considering the wide distribution of both species, at least as regarded in the current literature, this classification results in an underestimation of diversity. Comparative analysis of the morphology of *P. fasciatum* and *P. tigrinum* throughout their ranges supports the prediction that each major river basin of the region (e.g., Guyanas) represents a different species. Thus, the *P. fasciatum* and *P. tigrinum* clades represent six and two different species, respectively. This brings the total number of species recognized in *Pseudoplatystoma* to eight. Two species (*P. punctifer* and *P. tigrinum*) are sympatric in the Amazon Basin, two (*P. metaense* and *P. orinocoense*) are sympatric in the Orinoco Basin, and two others, *P. corruscans* and *P. reticulatum*, are sympatric in the Paraná. *Pseudoplatystoma magdaleniatum* and *P. fasciatum* each occur as the only species of *Pseudoplatystoma* in their respective individual ranges. *Pseudoplatystoma reticulatum* may be sympatric with the two other species in the Amazon Basin, but we have no records of them being captured together in the mainstem or tributaries. Herein we restrict *P. fasciatum* to the Essequibo, Rupununi and Suriname rivers. Whether *P. fasciatum*, as envisioned here, was fractured as a result of vicariance events is difficult to test because the Guyanan Shield antedates the formation of the major river basins in northern South America (see Lundberg et al., 2000). Dispersion, the other alternative, requires interconnections between Guyana–Amazonian as well as Guyana–Orinocoan rivers. Indeed, connections do exist among some of the rivers, i.e., Branco–Essequibo rivers (Guyana region) and some lowland interconnections in the state of Pará (Brazil) that may have allowed Amazonian–Guyanan transfers (J. G. Lundberg, pers. comm.). Whether transfers occurred or still exist at the present time is not known. *Pseudoplatystoma fasciatum* may have evolved after dispersion from the Amazon River and in isolation during the last glaciation in the Pleistocene (2 Mya.). *Pseudoplatystoma orinocoense*, a species described here as new, resembles *P. fasciatum* and *P. punctifer*. The color pattern and anatomy characters are somewhat similar in these three species and they form a clade within *Pseudoplatystoma* (*[P. fasciatum + P. punctifer] + [P. orinocoense]* Buitrago–Suárez, 2005). The Amazon and Orinoco rivers are connected by the Casiquiare Canal; hence, fish species interchanges between these two basins are certainly possible. Furthermore, life history studies on *P. orinocoense* and *P. tigrinum* (Orinoco River basin) suggest that these two species make short migrations (Escobar et al., in prep.). Armbruster and Provenzano (2000) suggested that the Casiquiare canal has a recent origin. This suggestion coupled with observations of Escobar et al. (op. cit.) allows for a prediction that species of *Pseudoplatystoma* may have been isolated from one another for a much greater time period than previously thought. The same situation applies to *P. tigrinum* because it has been traditionally considered a widely distributed species throughout the Amazon and Orinoco rivers (Ringuelet et al., 1967; Mees, 1974; Schultz, 1944; Burgess, 1989), and has been confused with *P. reticulatum* (see below PCA).

PCA showed complete separation of *P. magdaleniatum* from *P. orinocoense* (Fig. 28A). PCA also showed

an almost complete separation of *P. magdaleniatum* from *P. fasciatum*, but no separation between that species and *P. punctifer*. PC2 is most strongly and negatively affected by the dorsal fin base length and anal fin base length, and positively affected by the maxillary barbel length and the anterior chin barbel length.

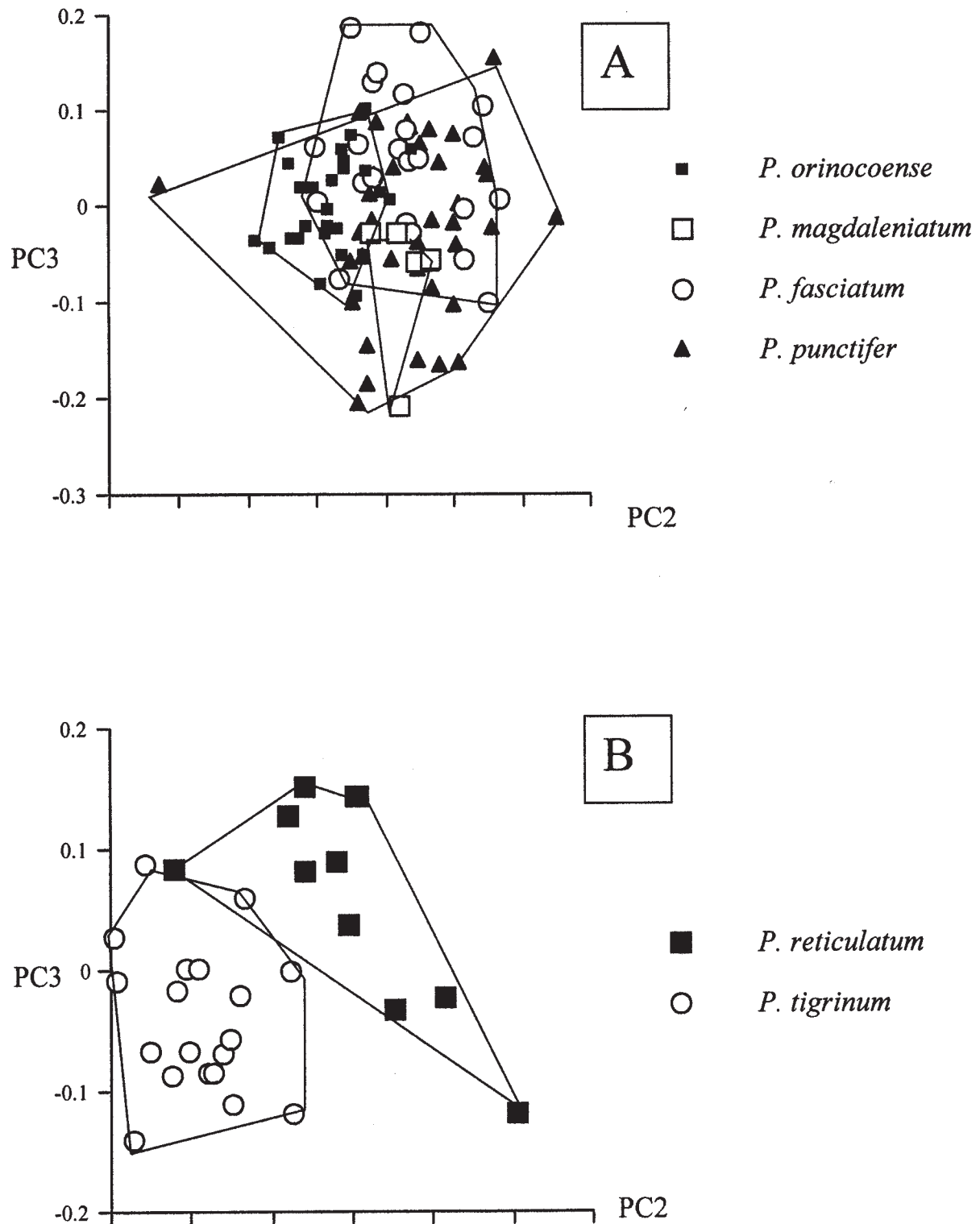


FIGURE 28. Principal component analyses of the species of *Pseudoplatystoma* with similar pigmentation patterns. A, species with dark vertical bars; and B, species with loops.

TABLE 9. Morphological comparison among the species of *Pseudoplatystoma*

Species	Dark vertical bars	Dorsal connection of lateral bars	Pale vertical bars	Loop-like bars	Spots on lateral side of body	Spots on head	Spots on caudal fin	Modal number of Vertebrae (range)	Mean \pm SD Anal fin base length	Length of vertebral complex	Connection of first anal spinelet to vertebral column
<i>P. fasciatum</i>	Present, and not extending beyond dusky region	connected	yes	not common	spots along side, underneath of dusky area	not common	few and small, range of 28-32	42-44	30.4 \pm 10.1	longer than wide	connection to the 24th vertebra
<i>P. punctifer</i>	Present, and not extending beyond dusky region	not connected	yes	not common	spots along side, underneath of dusky area	not common	few and small, range of 28-32	37-40	24.8 \pm 8	as long as wide	connection to the 22nd vertebra
<i>P. orinocoense</i>	Present, and extending far down the dusky region	connected	yes	not common	no spots anteriorly, but few posteriorly, underneath dusky area of body	not common	few and small, range of 28-32	39-41	32.2 \pm 11.6	as long as wide	connection to the 22nd vertebra
<i>P. reticulatum</i>	not common (few individuals)	connected	no	body covered by loops forming cells	no spots	common	few and small, range of 28-32	42-43	36.1 \pm 12.9	as long as wide	connection to the 23rd/24th vertebra
<i>P. magdaleniatum</i>	not common (few individuals)	connected	no	not common	spots along side, underneath of dusky area	not common	many and large, range of 37-44	43	43.4 \pm 7.4	as long as wide	connection to the 24th/25th vertebra
<i>P. corruscans</i>	not common (few individuals)	not connected	yes	absent	large spots distributed regularly on 6/8 rows along side of body	none	few and small, range of 15-39	44-47	30.8 \pm 7.1	as long as wide	connection to the 26th/27th vertebra
<i>P. tigrinum</i>	not common (few individuals)	connected	no	body covered by loops forming cells	no spots	none	many and large, range of 37-55	34-36	26.5 \pm 7	as long as wide	connection to the 20th vertebra
<i>P. metaense</i>	not common (few individuals)	connected	no	not common	large spots randomly distributed on dusky region along side of body	none	many and large, range of 37-55	35	35.5 \pm 11.1	as long as wide	connection to the 19th vertebra
Currently confused with <i>P. corruscans</i>											

PCA showed complete separation of *P. reticulatum* from *P. tigrinum* (Fig. 28B). PC2 is strongly and negatively affected by the dorsal fin base length and adipose fin length, and positively affected by the distance between the pectoral fin and pelvic fin. Separation of *P. reticulatum* and *P. tigrinum* is consistent with differences in morphology. These two species have similar pigmentation pattern represented by dark loops. PC analyses were not informative when *P. fasciatum* and *P. punctifer* were studied together. These two are presumed sister species and have a similar head and body shape. The same situation was observed when PCA was applied to *P. corruscans* (São Francisco River) and *P. corruscans* (Paraná River).

Cuvier and Valenciennes (1840) and Schomburgk (1841) commented on a structure noticed by Schneider on *P. fasciatum* from Suriname. Schneider (no date) observed a small hole on each side above the pectoral fin by which the abdomen presumably inflated. We did not find such a pore in the material examined, and moreover there is neither an internal organ associated with such a pore nor ducts connected to the skin that might allow any suggestion of the presence of external pores.

We have seen tiny young of *Pseudoplatystoma* being marketed in the ornamental fish trade in both North and South America. Individuals were too small for certain identification, but slight pattern and shape differences may indicate that more than one species is being imported. All the species are sold commonly in the numerous open fish markets throughout much of South America. Catch data from the different basins can now be better clarified to include all eight species of *Pseudoplatystoma*, and will allow for more accurate assessment of fishing impact on all the species.

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